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ABSTRACT

This report is an attempt to add to the existing information about cannabis use, its correlates, and its effects. The sample population consisted of self-admitted abusers of various drugs, identified shortly after entering the Air Force. The subjects (N=4688) were located through the Drug Control Office at Lackland Air Force Base. Variables studied were race, hometown, Aptitude Index, years of education, age or time of enlistment and performance in the Air Force. Study results indicate that: (1) A positive relationship exists between the extent of cannabis use and abuse of other drugs (hallucinogens, amphetamines, barbiturates, opiates, and volatile substances); (2) The percentage of cannabis users is proportionally greater in the North-Northwest and Far West-Pacific Coast than in the Mid-Atlantic, North Central and Far South - Southwest areas; (3) The greater the cannabis abuse, the more likely the subject is to have lower aptitude and fewer than 12 years of education; (4) Cannabis is the drug of preference among whites although Black users abuse it more frequently; and (5) Cannabis users have lower performance ratings and promotion rates compared to the control sample. (EK)

AFHRL-TR-73-33

VARIABLES RELATED TO PRE-SERVICE CANNABIS USE IN A SAMPLE OF AIR FORCE ENLISTEES

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November 1973

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Approved for publication.

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PREFACE

This work was conducted under Project 7719, Air Force Personnel Systems Development on Selection, Assignment, Evaluation, Quality Control, Retention, Promotion, and Utilization; Task 771913, Research on the Impact of Socio-Political Changes on Personnel Management Devices and Systems.

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VARIABLES RELATED TO PRE-SERVICE CANNABIS USE IN A SAMPLE OF AIR FORCE ENLISTEES

I. INTRODUCTION

The history, pharmacology, and botany of the cannabis plant have been given in several other works (Bloomquist, 1968, 1971; Grinspoon, 1971), and there is little argument about these aspects of cannabis. Only a few of the more salient points will be mentioned here.

A considerable commerce has revolved about the many products made from the cannabis plant, which is also known as hemp. Only one species of cannabis is known, although there are several varieties of this species. The resin of the plant contains certain chemicals called tetrahydrocannabinols, or THC, which, when smoked or swallowed, produce psychotoxic or mind-affecting changes in the user. There are varying degrees of potency of THC found in cannabis preparations. In its milder forms, the drug is called marijuana. In more potent forms it is called hashish. There are dozens of synonyms for these and for intermediate strengths of cannabis preparations. Pharmacologically, cannabis is classed as a mild hallucinogen. On these points, there is little disagreement.

When one moves on to the social and psychological effects of cannabis, however, one discovers considerable argument, with the emotionality usually attendant upon strong controversy. Positions range from that of Cholst (1966), who claims that non-users "have sold their souls . . . for financial success," to that of Campbell, Evans, Thomson, and Williams (1971) and Kolansky and Moore (1971) whose clinical studies lead them to conclude that regular cannabis use over a period of time results in cerebral atrophy and severe personality disorder. Most investigators agree that more information on the effects of cannabis is needed before a strong stand can be taken either way, and yet strong stands are being taken. This report is an attempt to add to the existing pool of information about cannabis use, its correlates, and its effects.

II. METHOD

Drug Abuser (DA) Sample

A sample of self-admitted abusers of various drugs was available, all of whom were identified as drug abusers either in 1970 (N = 1,471) or in 1971 (N = 3,218). Most were identified shortly after entering the Air Force.

The subjects for this study were obtained through the Drug Control Office (DCO) at Lackland AFB. A brief history of the DCO and of this sample seems to be appropriate.

Before June of 1969, the DCO had no official guidelines other than to maintain records of individual drug abuse histories at the direction of the Basic Military Squadron Commander. In June of 1969, Lackland Military Training Center (LMTC) established guidelines for identifying and dealing with pre-service drug abusers. At this time, the Assessments Branch (Human Reliability Program) was directed to identify those people who had used drugs, and to refer them to the DCO, with the exception of those who had experimented with marijuana once or twice. Drug abusers were also identified by other agencies and referred to the DCO. Thus, the DCO subjects came from five different sources. The relative proportions of subjects identified by these five sources of identification have changed at various periods during the history of the DCO, but for this particular sample including all of those identified in 1970 and those identified through September 1, 1971, the proportions are as follows:

Human Reliability Program - 73.9%
Squadron Commander's Incoming Briefing - 16.3%
Mental Hygiene - 8.0%
Medical Referral - 1.1%
Security Police - 0.8%

From June of 1969 until May of 1970, policies affecting available or prescribed routes for membership in the DCO sample remained relatively stable. In May 1970, it was decided that, for DCO referral, the Assessments Branch would make no distinction between marijuana experimenters and users among

applicants for jobs which fall under the Human Reliability Program. In August of 1970, the Air Force Drug Abuse Staff Study was published, the precursor of AFR 30-19. While this document did not influence accessions, it did define the terms "addict," "user," and "experimenter." In May of 1971, the limited privileged communications program was implemented. It did not affect basic airmen, however, so there is no good reason to believe that this program influenced the DCO sample in any way.

In August of 1971, AFR 30-19 was implemented. Strict terms of disposition of airmen identified as pre-service drug abusers may have had some effect on the sample from that time on as to accuracy of self-identification. As of the time the last subject in this sample was identified, the provisions of AFR 30-19 pertaining to pre-enlistment screening by Air Force recruiters had not yet been implemented.

The DA sample is somewhat biased compared with the general incoming basic airman population. Slightly over 73 percent of these subjects admitted their drug abuse during an interview for placement in human reliability jobs in the Air Force. At the time this sample was identified, only airmen with higher than average Airman Qualifying Examination (AQE) scores were interviewed, so this group will have higher mean scores on all aptitude tests, since all the aptitude test scores are somewhat interrelated. This selection will also indirectly introduce other biases associated with aptitude.

Control Sample

Because of the bias introduced into the drug abuser sample through the selection process, it was necessary to compose a control group of subjects with no known history of drug abuse. The operational selection procedure of subjects for the Human Reliability Program was too complicated to use as a practical method of obtaining the match between drug abusers and control subjects, so it was decided to match two control subjects for each abuser subject only on the General Aptitude Index of the AQE and on date of entry. Because of the interrelationships among the various aptitude measures, this matching process should produce a control group reasonably similar to the drug abuse sample on those variables used in the human reliability selection process. Both these samples—the DA and control samples—should be biased about equally on aptitude relative to the general population of incoming airmen. There is no known bias associated with any of the other four sources of identification.

Cannabis (CA) Sample

Within the DA sample, 4,564 subjects (97.3 percent of the DA sample) admit that they have used cannabis. The CA sample will be used for all comparisons in this study.

General Considerations About the Samples

It should be mentioned at this point that neither the drug abuser sample nor the control sample generated for comparison purposes is a perfectly "pure" group in the experimental sense. The drug abuser sample probably contains some subjects, who, for one reason or another, falsely claimed to have used drugs; and the control sample likely contains an unknown number of subjects who have used drugs but have not admitted it. A review of the history of the DA sample indicates that there is little reason to suspect that very much of the phenomenon of falsely claiming to have used drugs probably took place before September of 1971, the closing date for collection of data used in this study.

At any rate, the lack of purity in the two samples is not a cause for serious concern. Undoubtedly the two groups do differ in their relative amounts of experience with drugs, and it is this difference between them which will be investigated. The ultimate effect that this lack of purity should have on the conclusions reached in this study should be that all significant relationships are understated. If the two groups had been pure, the differences between them would have been greater.

For the purposes of this study, the term "drug abuser" will be used as defined in AFR 30-19, "One who has illegally, wrongfully, or improperly used any narcotic substance, marijuana, or dangerous drug." Therefore, in this study "drug abuser" is taken to mean anyone who has been identified as having used any of the following categories of drugs at least once: (1) cannabis, including marijuana and hashish, (2) amphetamines, if taken without prescription, (3) barbiturates, if taken without prescription, (4) hallucinogens, including LSD, peyote, and psilocybin, (5) opiates, including heroin, codeine, morphine and opium, and (6) other, including glue, cocaine, antihistamines, ether, gasoline, etc.

Even one admitted experience with any of the above placed the subject in the abuser group. It is a very broad term including all users of non-prescribed drugs from the one-time experimenter through the hard-core addict. Since any user of cannabis is, by this definition, a drug abuser, the terms "user" and "abuser" will be used synonymously in this study. The abuse of tobacco and alcohol, although serious problems in themselves, did not receive any attention in this study.

Variables

Information was available from the files concerning the total number of experiences by each subject in the drug abuser sample with the various drugs. The total use variables for some of the drugs ranged from zero to several thousand. Deciding upon appropriate intervals for displaying such widely ranging data involves some rather difficult judgments. For the purposes of the distributions upon which this study is based, an attempt was made to arrange total use variables into intervals so that each interval would contain enough cases to make comparisons meaningful, but also so that the range of intervals was large enough to make relationships observable.

Another variable, "multiple use," was also formed for the DA sample, reflecting the number of different drugs used by the subject, regardless of extent of use.

Other information was available on each subject in all three samples from general personnel files, from which the following were selected for investigation:

1. Race. Black or White.

2. Home of Record. This variable is an indication of the state in which the subject maintains his home of record, condensed into areas as follows:

a. North-Northeast. Maine, New Hampshire, Rhode Island, Vermont, Massachusetts, Connecticut, New York, or New Jersey.

b. Mid Atlantic-North Central. Delaware, Pennsylvania, Maryland, Virginia, W. Virginia, Kentucky, or Ohio.

c. South-Southwest. Alabama, Florida, N. Carolina, S. Carolina, Georgia, Tennessee, Mississippi, Arkansas, New Mexico, Oklahoma, Louisiana or Texas.

d. Middle West. Illinois, Indiana, Michigan, Missouri, Wisconsin, Colorado, Iowa, Kansas, N. Dakota, S. Dakota, Minnesota, Nebraska, or Wyoming.

e. Far West-Pacific Coast. Arizona, California, Idaho, Oregon, Montana, Washington, Nevada, Utah, Alaska, or Hawaii.

f. Other.

3. Armed Forces Qualification Test (AFQT) score.

4. Airman Qualifying Examination (AQE), Mechanical Aptitude Index.

5. AQE, Administrative Aptitude Index.

6. AQE, General Aptitude Index.

7. AQE, Electronic Aptitude Index.

8. Education in years at enlistment.

9. Age in years at enlistment.

10. Religious Denomination.

11. Desirability code - indicating whether the subject is still on active duty, and the kind of discharge if the subject is not still on active duty.

12. Last Airman Performance Report (APR).

13. Current grade.

Analysis

The analytic approach to the data of this report is that of distributional analysis. A correlational study of these data (along with other data) is already being published (Mullins, Vitola, & Abellera, 1973). Selected variables are distributed together in this study in order to see how changes in one variable are associated with changes in the other. The analysis is divided into three major parts:

1. The relationship of cannabis use to the use of other drugs.
2. The relationship of cannabis use to background characteristics.
3. The relationship of cannabis use to measures of success.

III. RESULTS AND DISCUSSION

The relationship of cannabis use to the use of other drugs. Much confusion and contradiction exists in the literature concerning the relationship between the use of cannabis and the use of other drugs. At least part of the confusion is generated by attempts by various authors to prove that cannabis use does or does not *cause* the use of other drugs. For the purposes of this study, the position is taken that arguing over causation in the above sense is infertile. It is sufficient to indicate relationships where they exist between the use of cannabis and the use of other drugs.

Figure 1—and all the other figures in this report—are drawn to indicate the relationship between various use intervals of cannabis and some other characteristics. The vertical axis is nothing more than a percentage scale, from 0 to 100 percent, except in those instances where the full range of possible percentages would be a waste of space. Horizontally across the top of each graph will be separate intervals of cannabis use (for example, 1 means one use; 2 means two uses, and so on). Horizontally across the bottom of each graph will be the *N* of each use interval. Where Blacks and Whites are charted separately on the same graph, separate *N*'s for Blacks and Whites at each use interval will be reported.

Using the above information in interpreting Figure 1, the first point of the top line on the graph means that of the 846 subjects who report only one use of cannabis, 7 percent have also used some other

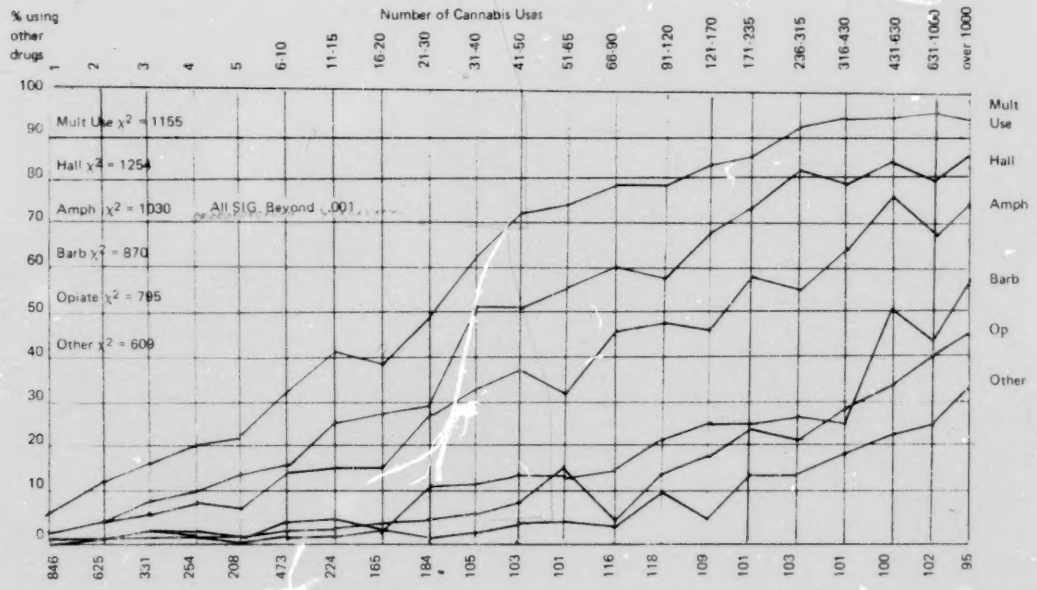

Figure 1. Relationships Between Degree of Cannabis Use and the Use of Other Drugs.

illicit drug. The sixth point on the top line of the graph comprising Figure 1 means, "Of the 473 subjects who report between 6 and 10 cannabis uses, 31 percent have used some additional illicit drug." As one more illustration, the first black circle in Figure 2 means, "Of the 71 Blacks who have used cannabis one time, 6 percent have also used amphetamines." The last black circle in the same Figure indicates that, of the 69 Blacks who have used cannabis over 235 times, 49 percent have used amphetamines. Similar information is given for Whites in the same graph, indicated by white circles. The first white circle indicates that, of the 775 Whites who have used cannabis one time, 2 percent have used amphetamines. Of the 432 Whites who have used cannabis over 235 times, 70 percent have used amphetamines.

The chi-square statistic was used to determine whether the points on the graph differ significantly from the mean for the entire group. Put graphically, chi-square is used to test whether or not there is significant deviation of the plotted curve from a horizontal line. The chi-square values are given with each graph for each plotted line.

Tables, rather than figures, are used where comparisons are made between the control group and the drug abuser group as a whole, regardless of the extent of abuse.

Cannabis use and multiple use. The top line in the graph (Figure 1) indicates the percentage of subjects in increasing intervals of cannabis use who have used at least one of the other categories of drugs. The curve indicates that the experimenter with cannabis is little more likely than the non-user to have used hallucinogens, amphetamines, barbiturates, opiates, or other illicit drugs at least once. However, the likelihood of use of other drugs increases sharply through increasing incidence of cannabis use until the expectation is reached that over 95 percent of the very heavy cannabis users have used at least one other drug as well. Perhaps the shape of this curve explains some of the argument in the literature concerning the relationship of cannabis use to use of other drugs. If the investigator is working with subjects who have used very little cannabis, he is likely to find little reason to worry that cannabis use is associated with abuse of other drugs. If he is studying people who have been heavy users of cannabis, he is likely to conclude that cannabis use does, indeed, lead to the use of other illicit substances. The correct position appears to be that abuse of other drugs is associated with the *extent* of cannabis use.

Cannabis use and the hallucinogens. Cannabis is itself a mild hallucinogen but for this study it forms a classification by itself. The hallucinogens category includes mostly LSD use, with some use of mescaline, peyote, and a few other "psychedelic" drugs. The curve showing the relationship between cannabis use and the hallucinogens indicates the percent of subjects at each cannabis use interval who have used one of the hallucinogens at least once. Again, there is a strong relationship between the heavy use of cannabis and the use of the hallucinogens, reaching well into the ninth decile (86 percent) in the interval of heaviest cannabis use.

This graph supports the position of McGlothlin, Cohen, and McGlothlin (1969), who have shown a strong relationship between prior use of marijuana and positive attitude toward using LSD. It also supports Blum (1970) and Mullins et al. (1973), who reported fairly substantial correlations between use of cannabis and use of the hallucinogens. Popoff (1970) has also reported that LSD use varies with frequency of marijuana use.

Cannabis use and amphetamine use. Not much has been done on the relationship between cannabis use and the use of amphetamines. It was noticed by Popoff (1970) in the study previously cited that 24 percent of daily users of marijuana used amphetamines once a week, whereas only 8 percent of those who used marijuana once a month or less often used amphetamines once a week. Blum (1970) has reported a correlation ($r = .33$) between use of marijuana and use of amphetamines in college students, and Mullins et al., (1973) report a correlation ($r = .30$) between use of cannabis and use of amphetamines in a sample of incoming basic airmen.

The amphetamine curve in Figure 1 shows essentially the same characteristics as the hallucinogen and the multiple use curves, except that the relationship between cannabis use and amphetamine use is not quite as strong across the entire range of interest as the relationships indicated by the other two mentioned curves.

Cannabis use and barbiturate use. The use of barbiturates also increases as use of cannabis increases. The curve representing barbiturate use in Figure 1, however, appears to begin a significant upward direction

only after more experience with cannabis than is true for the amphetamines and the hallucinogens, and the overall relationship remains noticeably less over the entire range of cannabis use.

Cannabis use and opiate use. The opiate category is composed almost entirely of heroin users. The relationship between cannabis use and the use of heroin has been hotly debated in the literature. Maurer and Vogel (1971, p. 126) say "(Marijuana smoking) is characteristically the first step to heroin addiction, especially among the youngsters who become habituated to marijuana." O'Donnell, writing in *Drugs and Youth* (1969, p. 67) says, "A similar question of current concern is whether or not marijuana use leads to heroin use, and it is somewhat surprising that we have so little firm data on a question of such importance . . . . There is, therefore, evidence which can plausibly be interpreted, and has been interpreted by competent observers, as indicating that marijuana use does affect—in as yet unspecified ways—the probability of later use of heroin." In the same book, Einstein (p. 94), commenting on the current addict profile, says that we might be led to believe that "The cycle of drug use is marijuana, followed by sniffing, skin-popping and mainlining heroin." Popoff (1970) finds that the opiates, like the other drugs, are related progressively to degree of cannabis use, with 14 percent of daily marijuana users having tried opiates more than once or twice.

On the other hand, Rosenthal (1967) says that the link between marijuana use and later heroin use is weak. Rosevear (1967) claims there is no relationship between the use of heroin and the use of marijuana. Cohen (1969, p. 59) says "Very few (marijuana users) go on to heroin, but some do." Fort (1969) dismisses any relationship between marijuana use and heroin use as "mythology" (p. 100). Apparently he agrees with Kaplan (1971) that criminalization of marijuana use—not the use itself—leads to the use of other drugs. Grinspoon (1969; 1971) disavows any substantial connection between the use of marijuana and the use of heroin.

The opiate line in Figure 1, to some extent, reconciles most of the above opinions from the literature. Depending on the part of the curve being considered, evidence could be found to substantiate most of the statements. Considered overall, the curve indicates that there is, indeed, a very observable relationship between the extent of cannabis use and heroin use, progressing from practically no association between use of the two drugs in subjects who have used cannabis 40 times or less to the upper ranges of cannabis use, where 47 percent of the subjects have also used opiates. It should be evident that these data do not at all address the question of causation. They merely indicate a statistical association.

Cannabis use and use of "Other" drugs. The "Other" category includes any illicit use of all psychotoxic substances not contained in the previous categories. The sniffing of various volatile substances (glue, ether, lighter fluid, gasoline, and others) fall into this category, as does the use of cocaine.

The "Other" category is apparently the least popular category associated with cannabis use. Only in the upper ranges of cannabis use (above 90), was this category clearly associated with cannabis, and even in the highest interval only 34 percent of those who had used cannabis more than 1,000 times had also used a substance in the "Other" category.

The lines in Figure 1 indicate the relationship between various degrees of use of cannabis and the likelihood of having had *one or more* experiences with the associated drugs. This could mean nothing more serious than that heavy users of cannabis tend to experiment with other drugs, and that serious involvement with associated drugs is no more likely in heavy cannabis users than it is with light users. The data in Table 1 were extracted and condensed from the more complete distributional tables to throw some light on this question. Table 1 shows clearly that it is not simply one-time use of the associated drugs which is related to heavy use of cannabis. Heavy use of one is related very strongly to heavy use of the other.

For example, there are 286 light users (1-2 times) of amphetamines in the sample. Of these, only 8—or 2.8 percent—were heavy cannabis users (more than 630 uses). On the other hand, there were 110 heavy amphetamine users (over 200 times), of whom 47 (42.7 percent) were heavy cannabis users. By comparing the two percentage columns, one can see clearly that the heavy cannabis users were also heavy—not light—users of associated drugs.

Racial effects on drug use interrelationships. Because so many previous publications have indicated a relationship between race and use of various drugs (Mullins et al., 1973; Louria, 1968), Figures 2 through 7 were constructed to show the relationship between cannabis use and the use of the other categories of drugs separately for Blacks and Whites. It is clear from this set of graphs that the relationship curves are similar,

Table 1. Heavy Cannabis Users (over 630 uses) Who Are Light Users of Associated Drugs Compared with Heavy Users of Associated Drugs

Associated Drug	Number of Uses (Light)	Total N, All Light Users	Heavy Cannabis Users Who Are Light Users of Associated Drugs: N	Heavy Cannabis Users Who Are Light Users of Associated Drugs: Percent Total N, Light Users	Number of Uses (Heavy)	Total N, All Heavy Users	Heavy Cannabis Users Who Are Heavy Users of Associated Drugs: N	Heavy Cannabis Users Who Are Heavy Users of Associated Drugs: Percent Total N, Heavy Users
Amphetamine	1–2	286	8	2.8	Over 200	110	47	42.7
Barbiturates	1–5	199	20	10.1	Over 100	98	48	49.0
Hallucinogens	1–2	392	14	3.6	Over 150	108	49	45.4
Opiates	1–5	135	23	17.0	Over 100	97	39	40.2
Other	1–5	199	22	21.6	Over 40	51	22	43.1
Multiple Use	2–3*	1331	69	5.2	5–6*	146	58	39.7

*Indicates number of drugs used including cannabis; not number of uses.

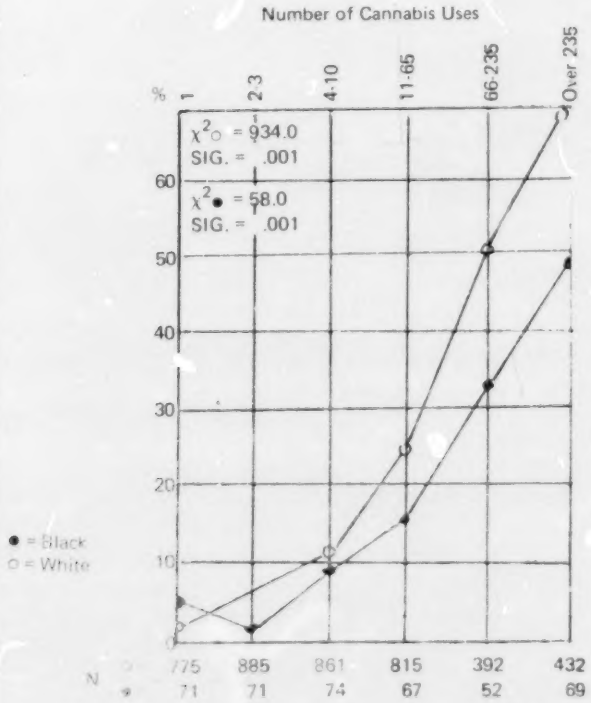

Figure 2. Cannabis Vs Amphetamines, Black and White.

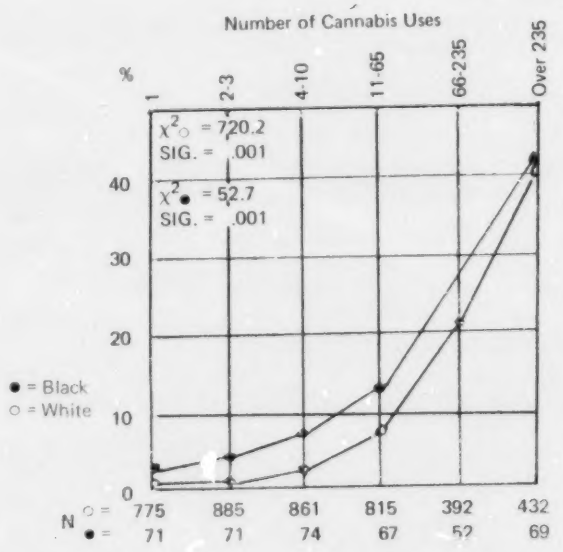

Figure 3. Cannabis Vs Barbiturates Black and White.

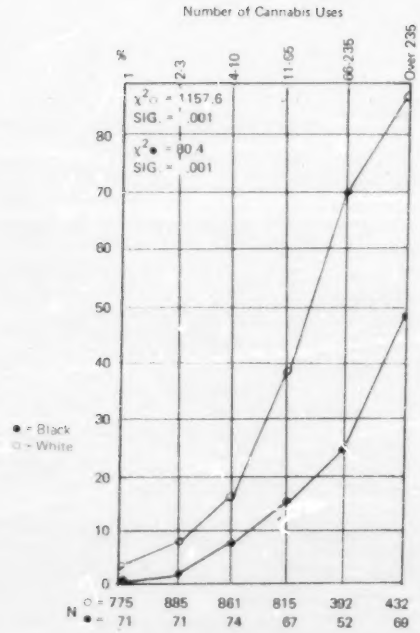

Figure 4. **Cannabis Vs Hallucinogens, Black and White.**

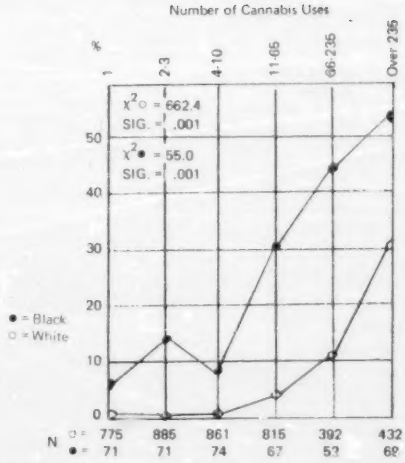

Figure 5. **Cannabis Vs Opiates, Black and White.**

Fig 12

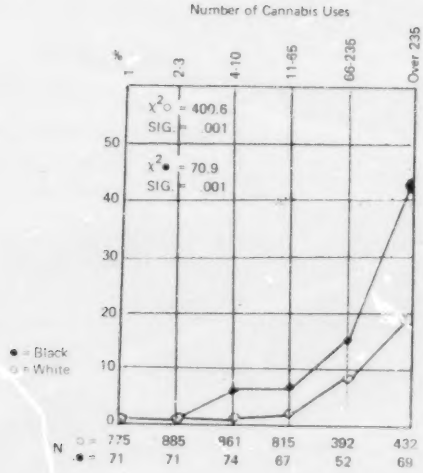

Figure 6. **Cannabis Vs "Other" Black and White.**

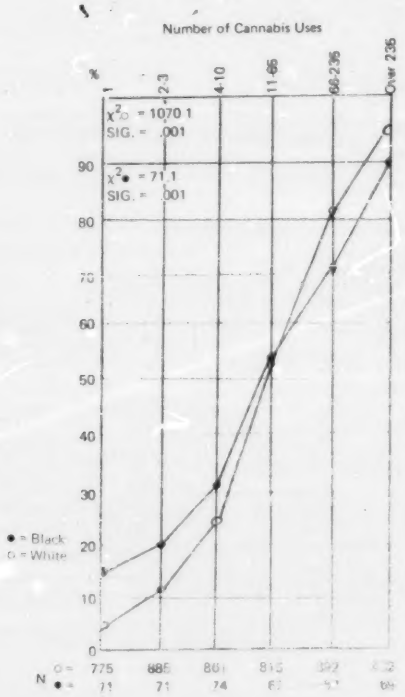

Figure 7. **Cannabis Vs Multiple Use, Black and White.**

with Blacks showing more involvement with opiates and "Other", and with Whites showing more involvement with amphetamines and hallucinogens. Use intervals have been collapsed in all Black-White tables and graphs in order to have enough Blacks to make percentages stable.

The Relationship of Cannabis Use to Background Characteristics

Geographical Area of Enlistment. Table 2 compares the cannabis users with the control sample on geographical area of enlistment. The percentage of cannabis users coming from the North-Northeast and from the Far West-Pacific Coast is disproportionately large, and the proportion of cannabis users coming from the Mid Atlantic-North Central and from the South-Southwest is relatively small compared with the control group.

Table 2. **Percentage Distributions of Cannabis Use by Area of Enlistment.**

Area of Enlistment	Cannabis Users	Control Sample
North-Northeast	20.4	16.9*
Mid-Atlantic-North Central	14.4	19.9*
South-Southwest	19.2	26.8*
Midwest	24.4	23.4 N/S
Far West-Pacific Coast	21.3	12.6*
Other	0.4	0.3 N/S
N	4564	9378

*Difference significant at .01 level.

Black-White relationships between degree of involvement and geographic area are shown in Figures 8 through 12. Generally, the slopes of the lines in the graphs for the Mid Atlantic-North Central, the South-Southwest, and the Midwest are downward, although only one curve (White, Midwest) is significantly different from a horizontal straight line. A downward sloping line would indicate less involvement in heavy cannabis use. The slopes of the lines for the North-Northeast and the Far West-Pacific coast areas are generally upward, indicating more heavy cannabis users in these areas. Only one, the Black curve for Far West-Pacific Coast, is not significant. The North-Northeast figure shows substantially more Black involvement with cannabis, particularly in the upper reaches of the graph, whereas Blacks contribute very little to the cannabis abuse problem in the Far West-Pacific Coast area. In the Far West-Pacific Coast area, White abuse of this drug is substantially greater than that of Blacks, at all points along the curve. At most points White involvement is over three times that of Blacks.

Race. Figure 13 shows the relationship between degrees of cannabis use and race in this sample. The percentage of Blacks at progressive intervals of use increases somewhat from 8 percent who have tried cannabis only once to a high of 19 percent who have used cannabis 631 to 1,000 times. At the highest interval, the percentage of Blacks who have used cannabis over 1,000 times drops back to 13 percent. As a matter of general interest, 10.5 percent of the control sample is Black, while only 8.9 percent of the entire cannabis abuse sample is Black. It appears that there is a slight tendency for cannabis to be a drug of preference of Whites, but for Blacks to become more deeply involved if they use it at all.

AFQT Category. Figure 14 shows the percentage of Category I and Category IV airmen at each level of cannabis abuse. The Category I airmen (the more talented) occupy about 10 to 15 percent of the

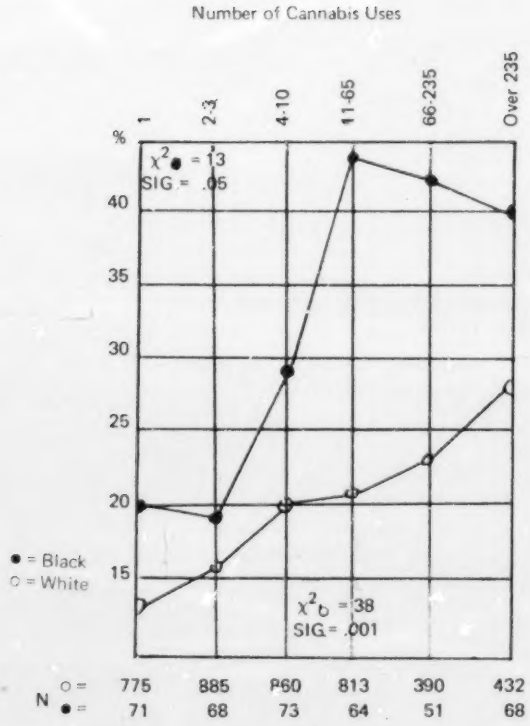

Figure 8. **Cannabis Use in the North-Northeast Area, Black and White.**

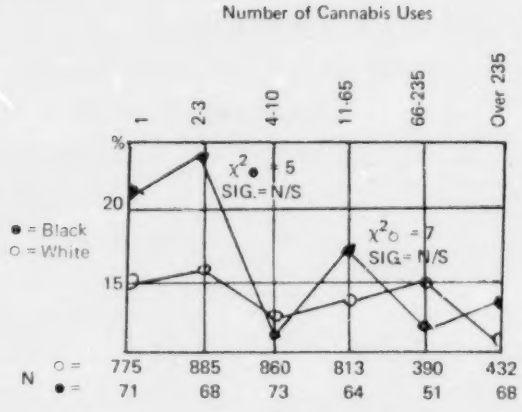

Figure 9. **Cannabis Use in the Mid-Atlantic-North Central Area, Black and White.**

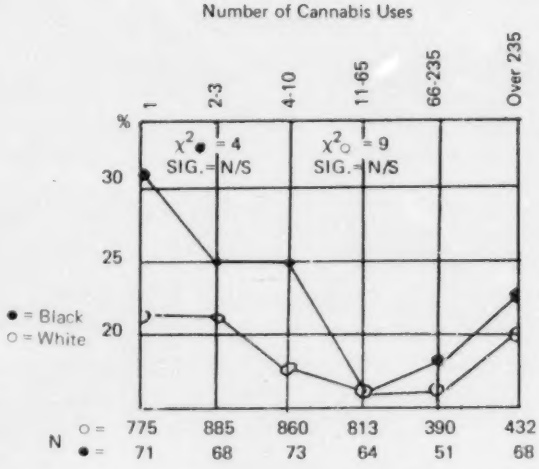

Figure 10. **Cannabis Use in the South-Southwest Area, Black and White.**

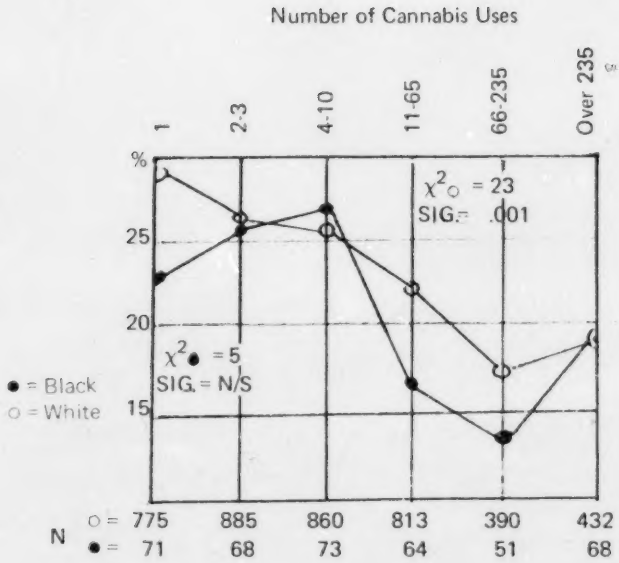

Figure 11. **Cannabis Use in the Midwest, Black and White.**

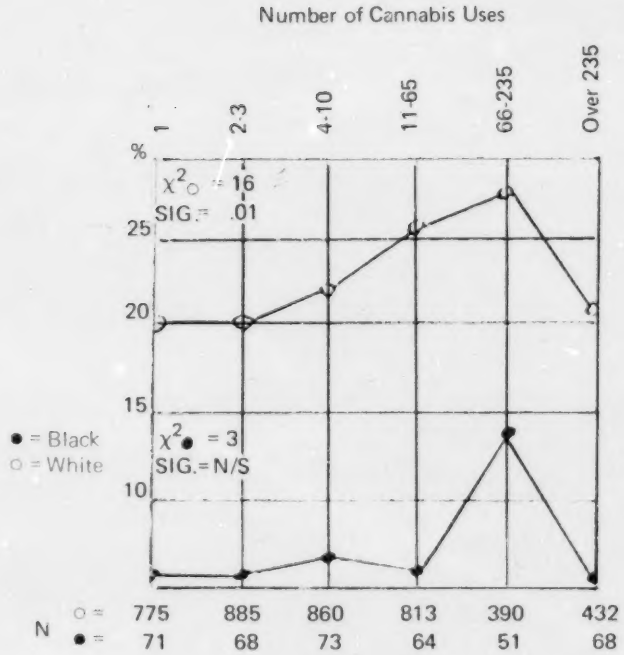

Figure 12. **Cannabis Use in the Far West-Pacific Coast Area, Black and White.**

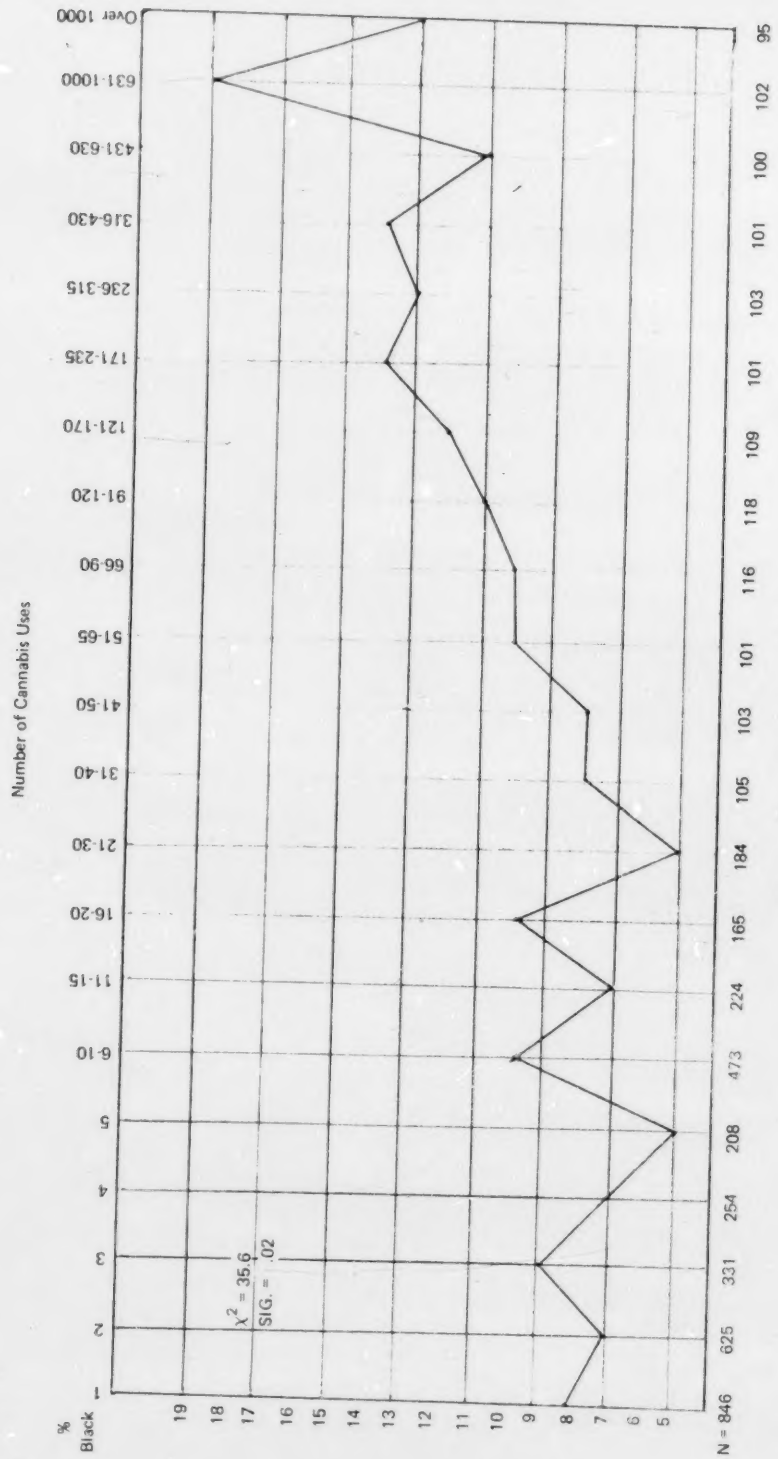

Figure 13. **Cannabis Use Vs Race.**

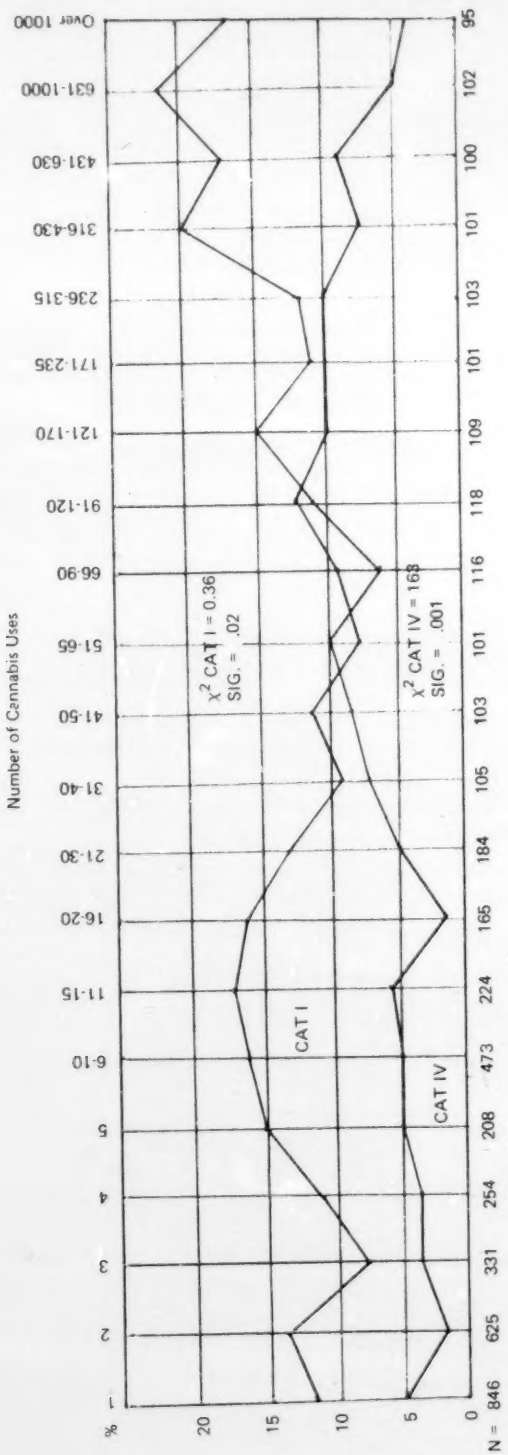

Figure 14. **Cannabis Use Vs AFQT.**

lower use categories, and drop to 5 percent or less in the heavier use categories. Conversely, the Category IV airmen start at 5 percent or less of the lower categories and climb to about 20 percent of the heavier use categories. These figures indicate rather clearly that degree of cannabis abuse is associated with mental ability, with the brighter airmen being less involved with heavy use, and the less bright ones more likely to be heavy users. The data give no indication as to which is cause and which is effect – they merely indicate the degree of association between cannabis use and AFQT category.

Figure 15 shows the same kind of relationship separately for Blacks and Whites. For both groups, the relationships between AFQT performance and degree of cannabis use is quite observable, except for the Category I Blacks, a very small group.

AQE Scores. As with AFQT categories, only the upper range of AQE scores (80 and above) and the lower range of scores (below 40) are displayed in Figures 16 through 19, showing the relationship of the four AQE aptitude indexes with degree of cannabis use for the total drug abuser sample, and in Figures 20 through 23 for Blacks and Whites separately. Again, there is clear indication of a rather strong negative relationship between aptitude and degree of cannabis use.

Educational Level. Figure 24 shows that the percentage of subjects with 12 years or more of education declines as experience with cannabis increases, and that the percentage increases with degree of involvement for those with less than 12 years of education. This relationship is shown also for Blacks and

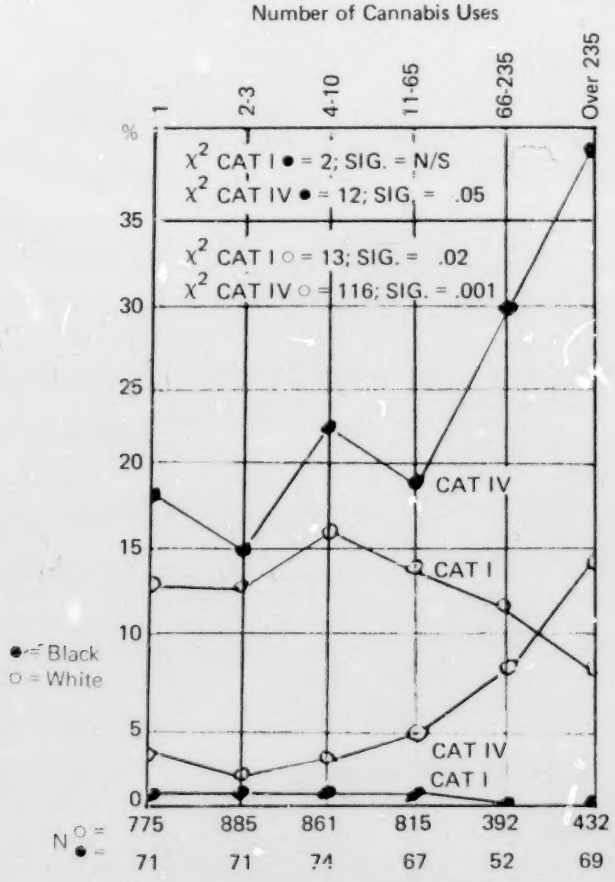

Figure 15. **Cannabis Use Vs AFQT Category, Black and White.**

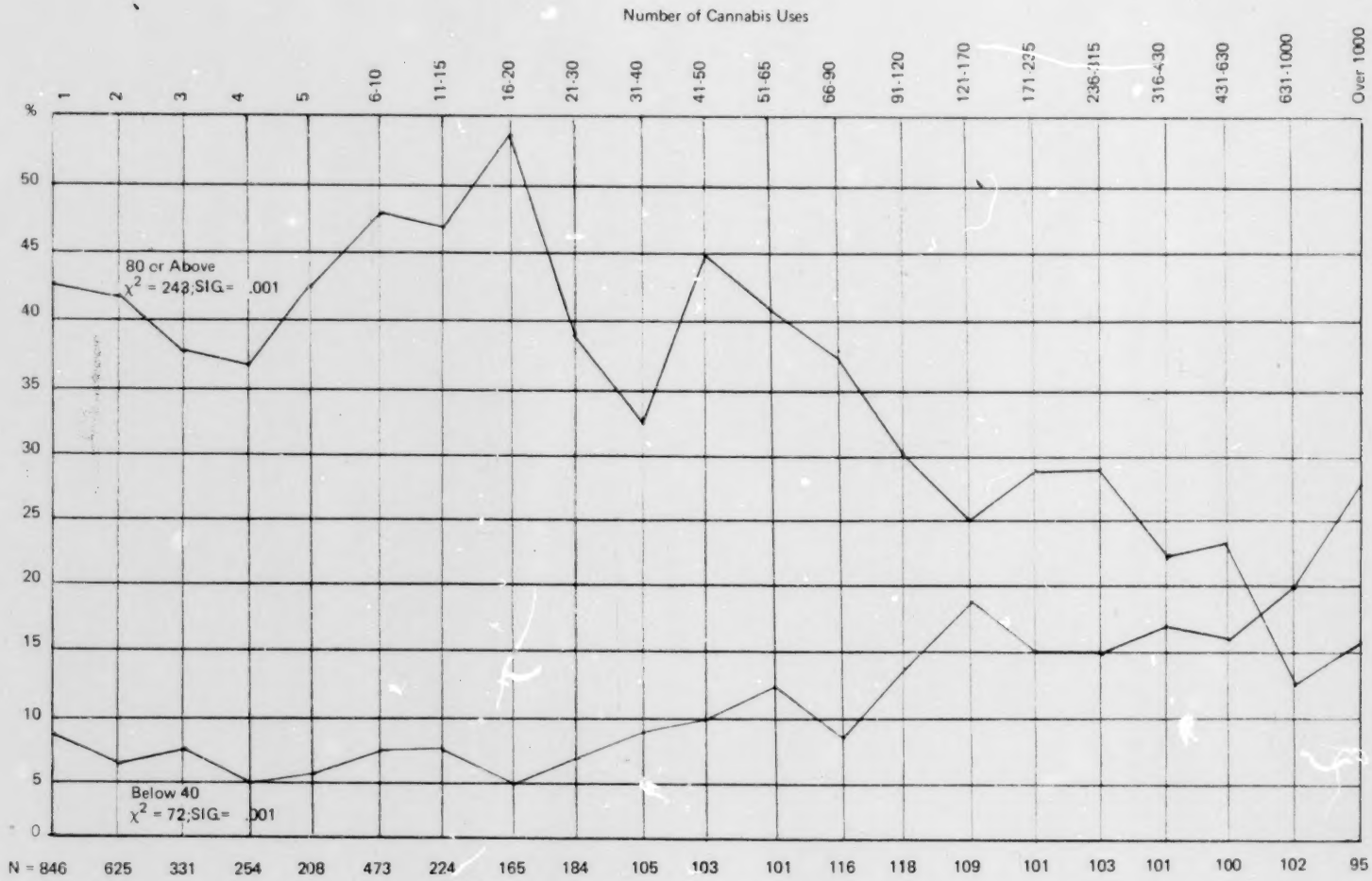

Figure 16. **Cannabis Use Vs AQE-M.**

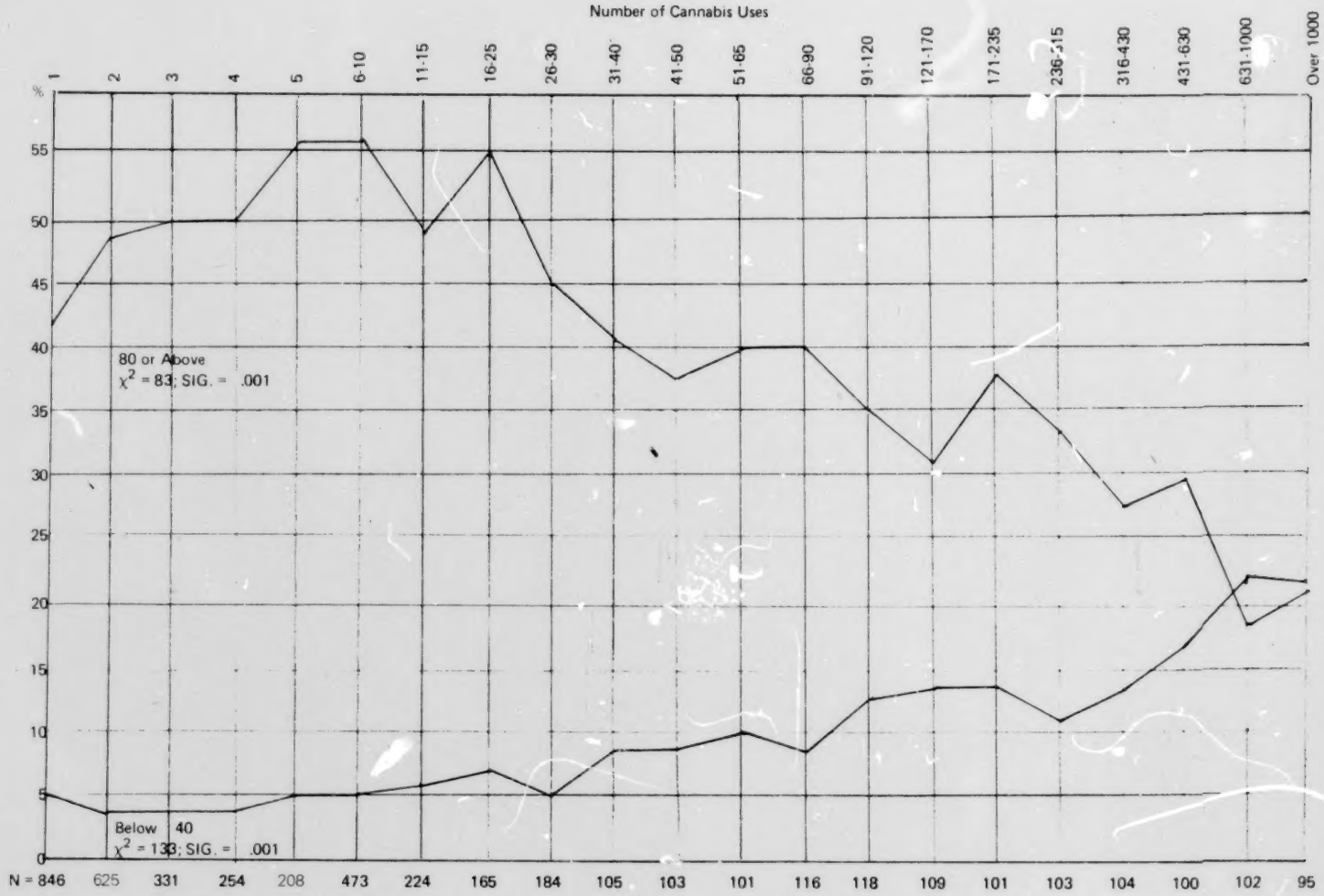

Figure 17. **Cannabis Use Vs AQE-A.**

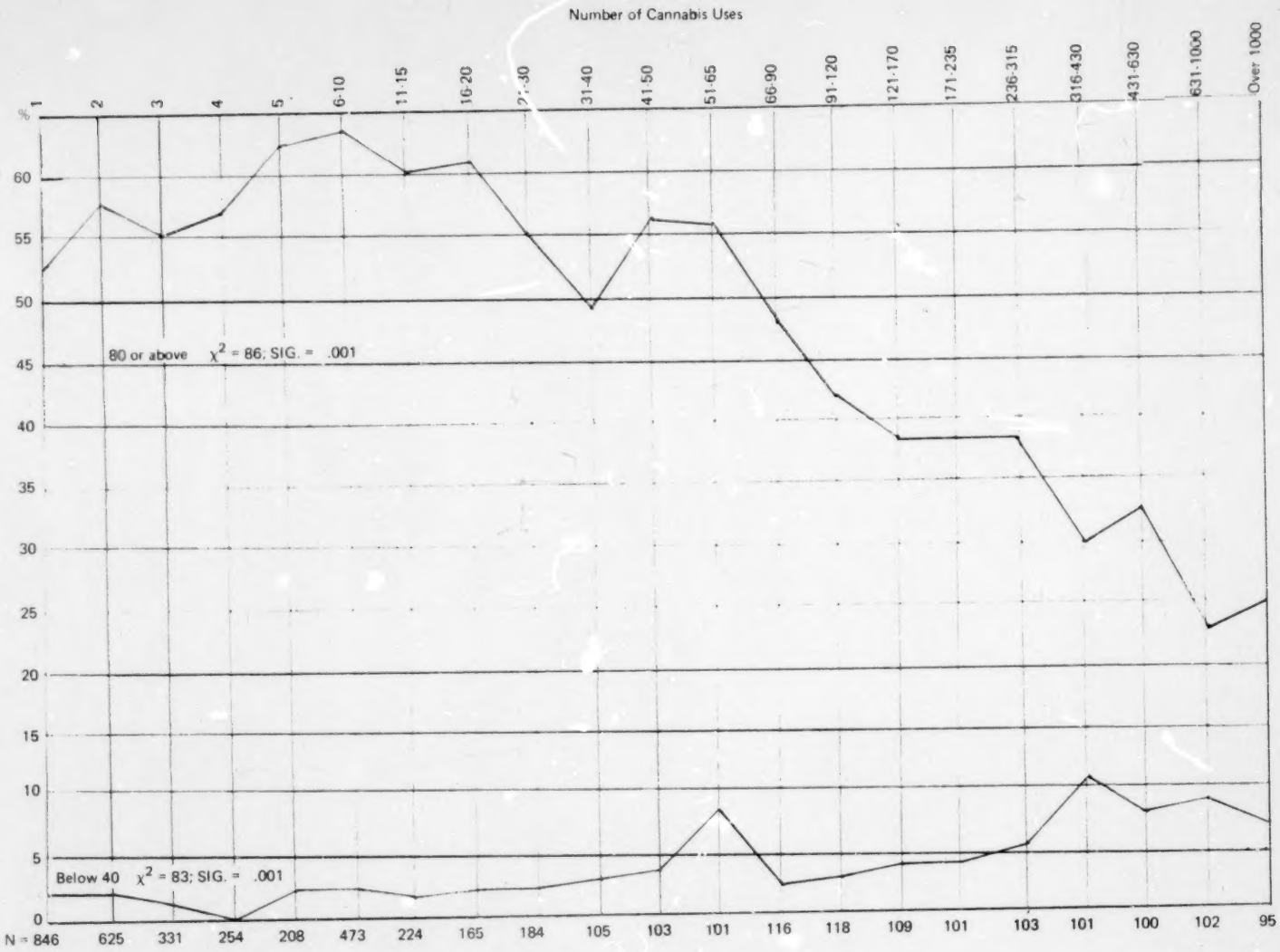

Figure 18. **Cannabis Use Vs AQE-G.**

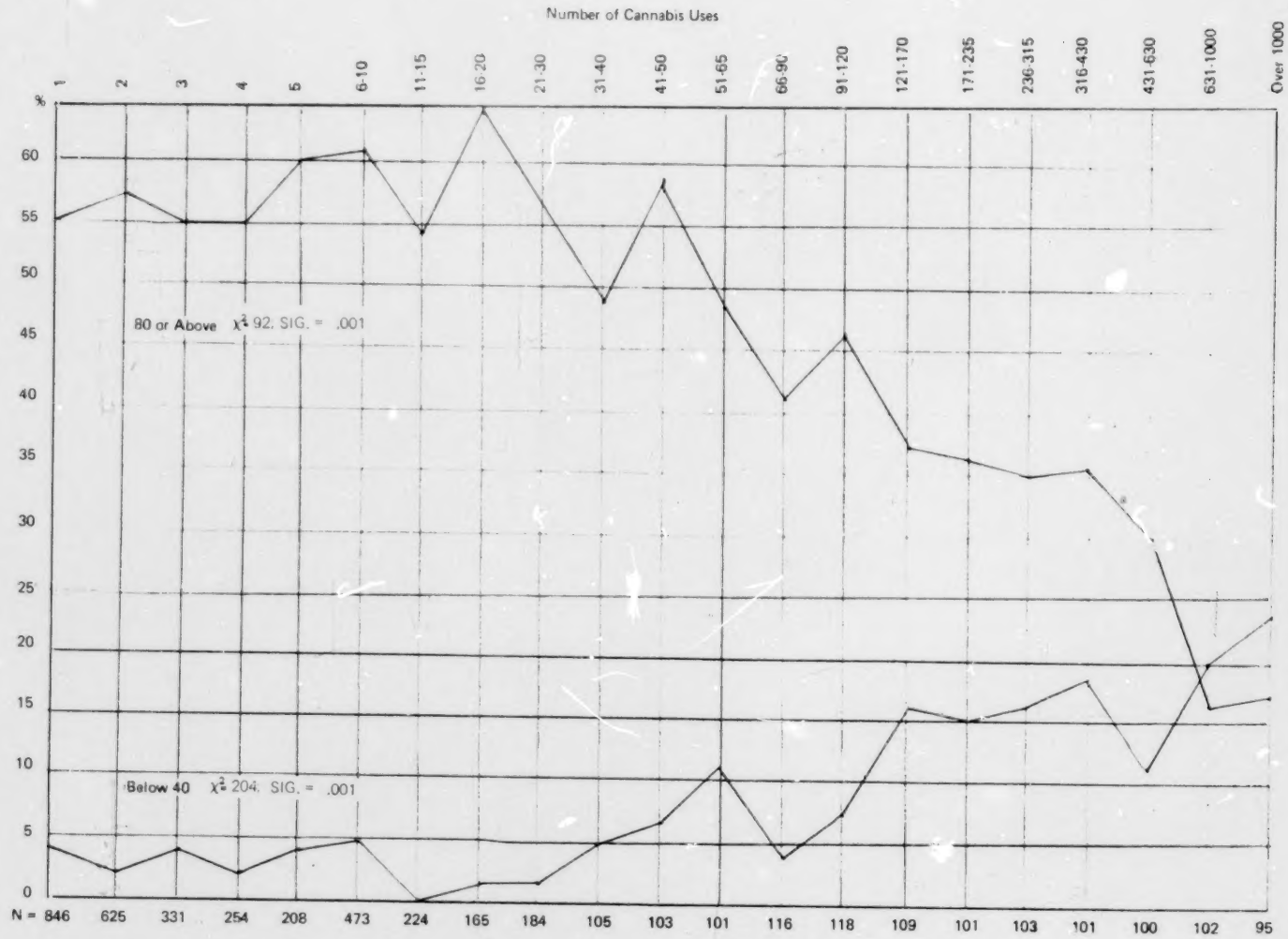

Figure 19. **Cannabis Use Vs AQE-E.**

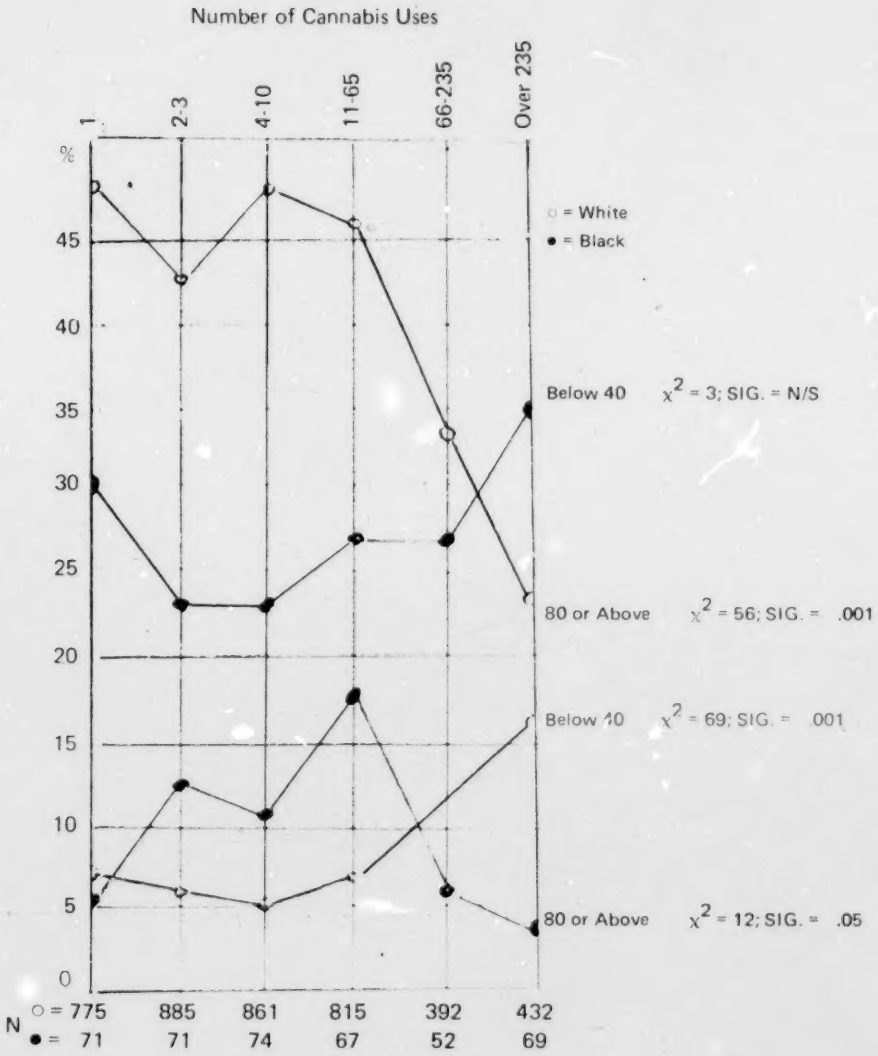

Figure 20. **Cannabis Use Vs AQE-M, White and Black.**

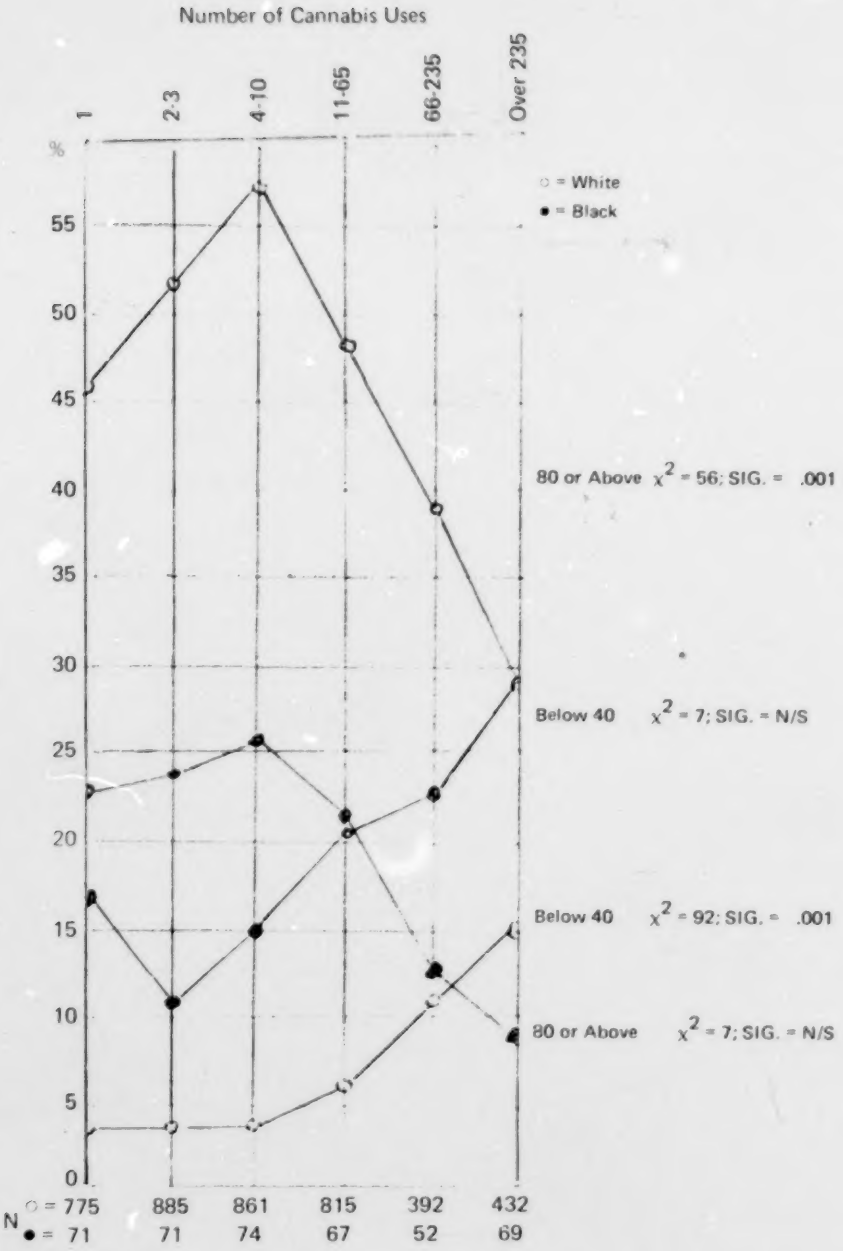

Figure 21. **Cannabis Use Vs AQE-A, White and Black.**

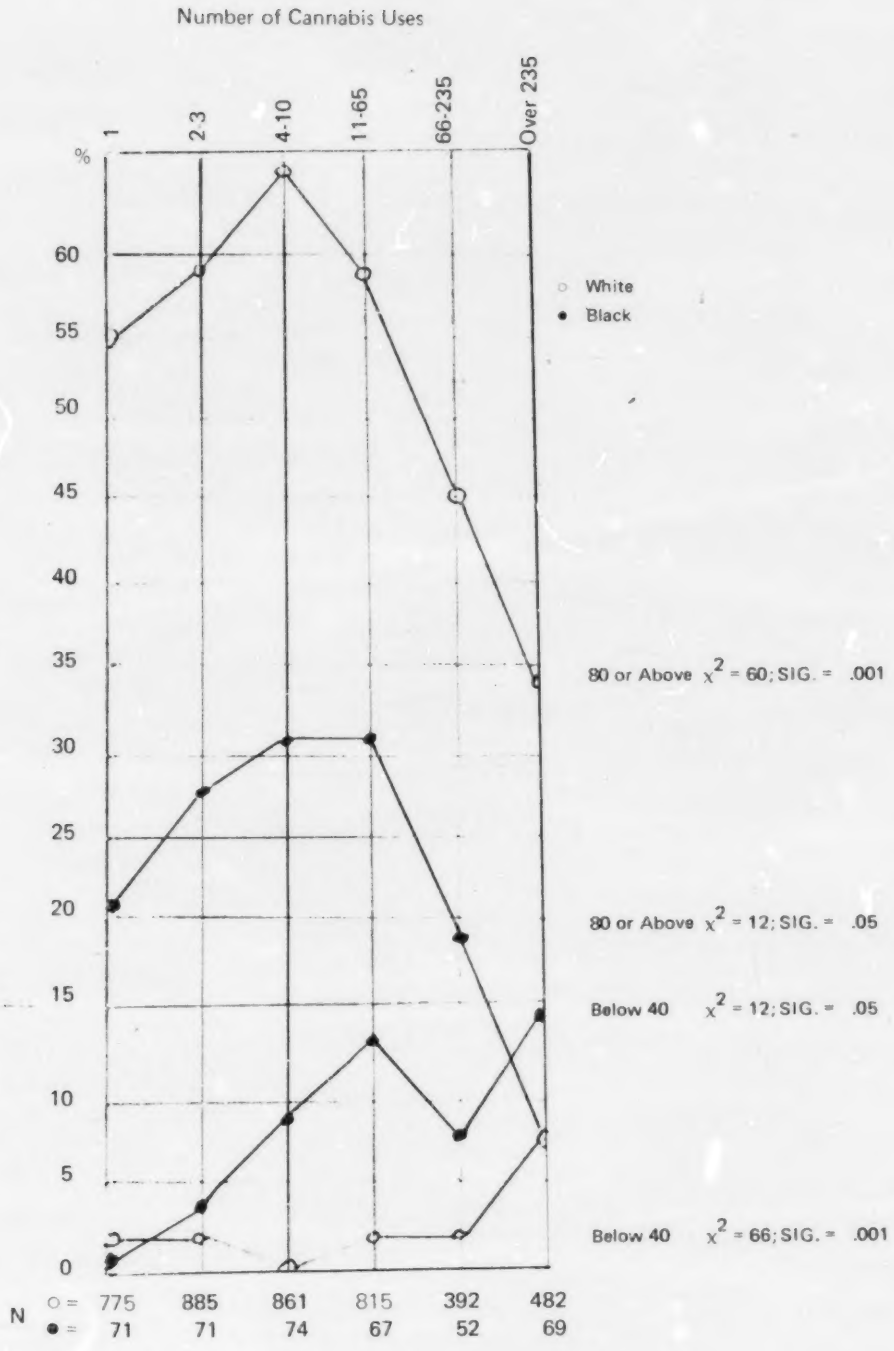

Figure 22. **Cannabis Use Vs AQE-G, White and Black.**

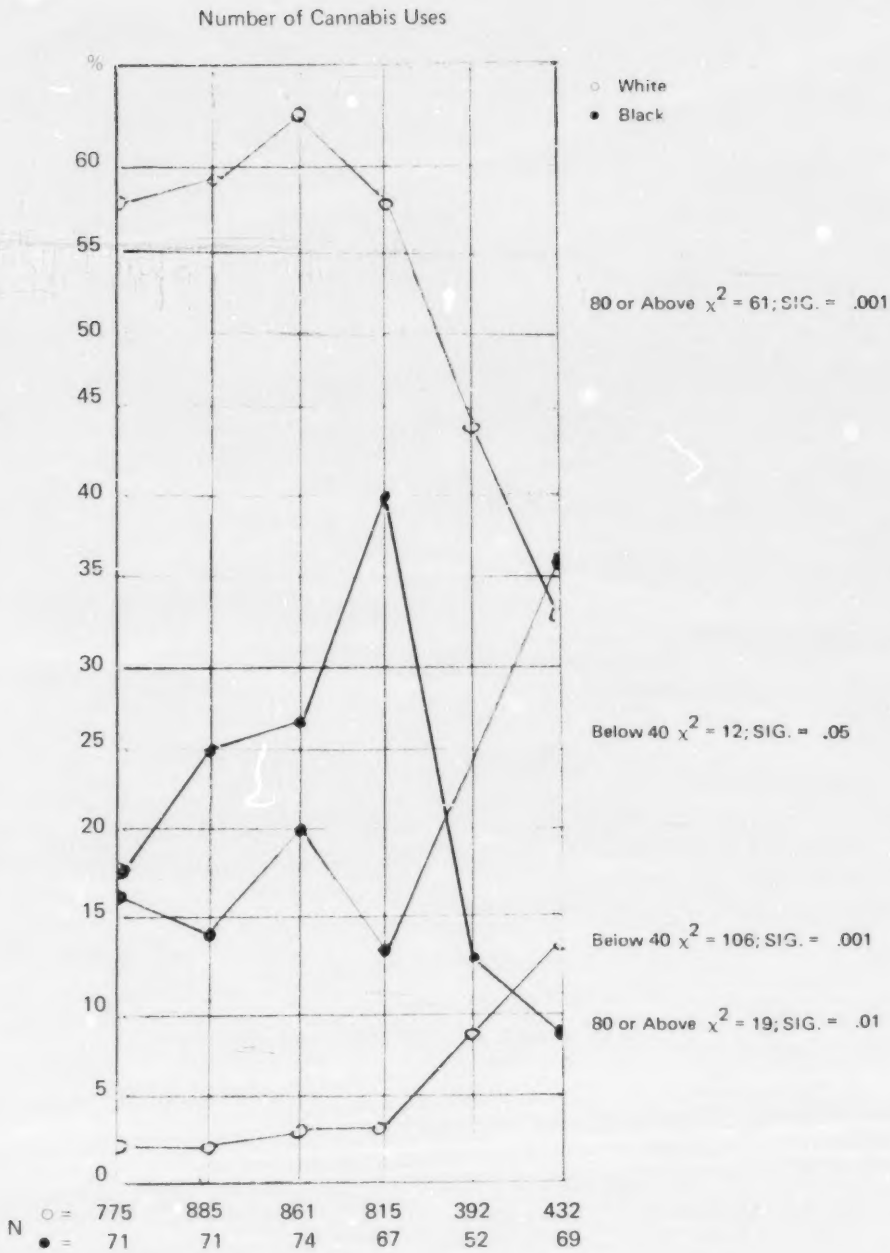

Figure 23. **Cannabis Use Vs AQE-E, White and Black.**

Whites separately (Figures 25 through 27). Again, although the Black curves are very much like the White curves, the Black *N's* are comparatively small, and two of the Black curves do not reach significance.

Age at enlistment. Table 3 indicates that the percentages of cannabis users found in ages 19, 20, and 21 are slightly higher than corresponding percentages of control subjects. The differences are not large, but they are the only ages at which this direction of difference occurs. Graphs indicating the relationship between age and degree of cannabis use show no clear trends, and were omitted from this report.

Religious Preference. Table 4 reveals that cannabis users, whether Black or White, are found more often than chance would dictate among Roman Catholics and those who indicate no preference. Cannabis users are found less often among Baptists. When the degree of involvement with cannabis is plotted against these three religious preferences for Blacks and Whites separately (Figure 28), it appears that "No Preference" is associated with a slight increasing tendency among Whites for deep involvement with cannabis use. "Roman Catholic" is associated with an increasing tendency among Whites toward deeper and deeper involvement with cannabis. "Baptist" is associated with a generally decreasing tendency toward deep involvement among Whites. In each of the graphs, the *N* for Blacks is so small, that the deviation from a straight line was not statistically significant, although Table 4 reveals that even with Blacks there are significant differences between the control group and the cannabis group for all three of these religions.

The relationship of cannabis use to measures of success. Desirability, APR, and promotion rate were taken as measures of Air Force success. These success measures were current as of July 1971. Any

Table 3. **Percentage Distributions of Drug Abuser and Control Subjects on Age at Enlistment**

Age at Enlistment	Cannabis Users	Control Subjects
17	4.1	4.5
18	24.4	26.4*
19	34.5	32.4*
20	20.0	17.5**
21	8.2	7.4
22	5.7	6.3
23	2.3	3.5**
24	0.6	1.3**
25	0.1	0.4**
26	0.0	0.1*
27	0.0	0.1*
28	0.0	0.0
N	4564	9378

* .05 level.

** .01 level.

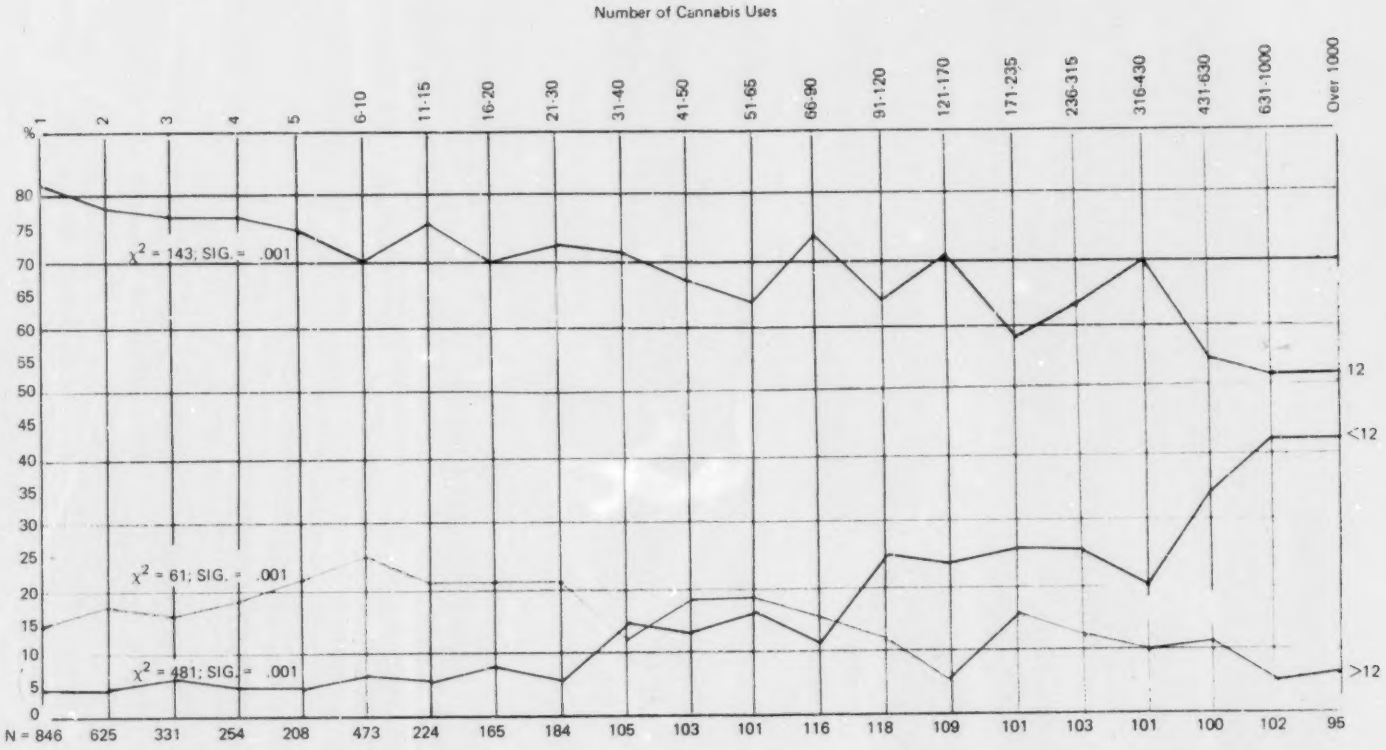

Figure 24. **Cannabis Use Vs Educational Level.**

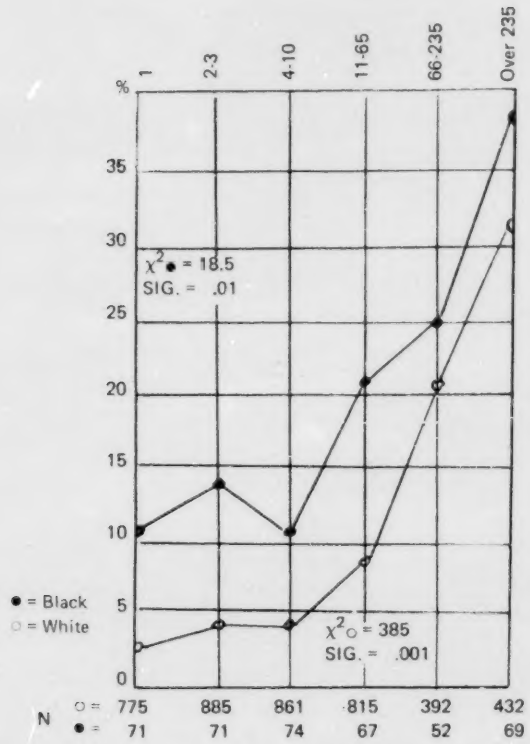

Figure 25. **Less Than 12th Grade.**

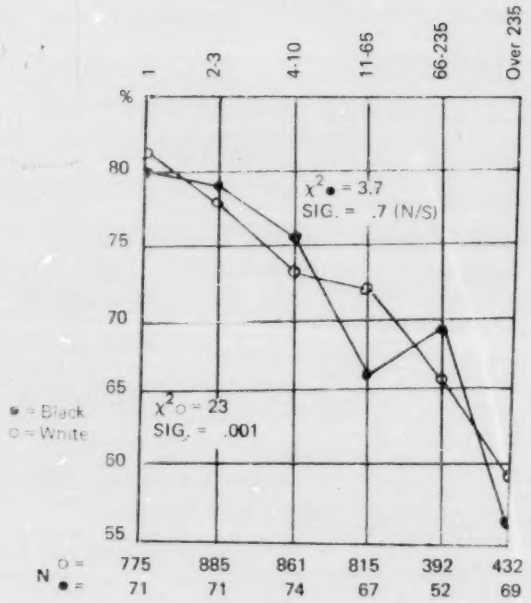

Figure 26. **12th Grade.**

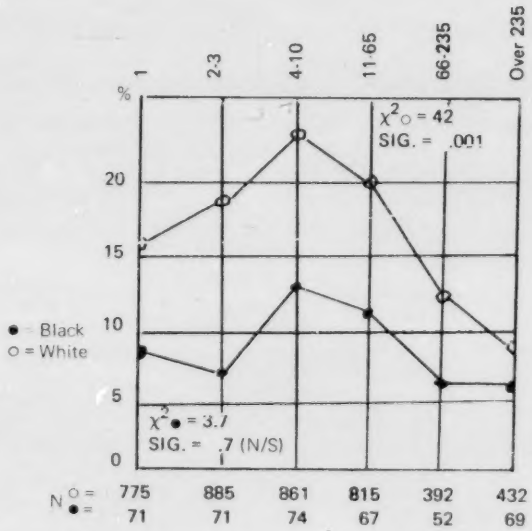

Figure 27. **Over 12th Grade**

Table 4. **Cannabis Use, Race, and Religious Preference.**

Religious Preference	Total Group				White				Black			
	Ca Users		Control		Ca Users		Control		Ca Users		Control	
	N	%	N	%	N	%	N	%	N	%	N	%
No Preference	719	15.8	961	10.2**	661	15.9	873	10.4**	58	14.4	88	8.9**
Baptist	729	16.0	2,196	23.4**	546	13.1	1,599	19.1**	183	45.3	597	60.4**
Church of Christ	83	1.8	237	2.5**	81	2.0	222	2.6**	2	0.5	15	1.5
Episcopal	116	2.5	183	2.0	113	2.7	175	2.1**	3	0.7	8	0.8
Jewish	46	1.0	51	0.5**	46	1.1	51	0.6**	0	0.0	0	0.0
Latter Day Saints	67	1.5	117	1.2	67	1.6	117	1.4	0	0.0	0	0.0
Lutheran	280	6.1	538	5.7	276	6.6	536	6.4	4	1.0	2	0.2*
Methodist	406	8.9	1,067	11.4**	372	8.9	971	11.6**	34	8.4	96	9.7
Presbyterian	168	3.7	359	3.8	165	4.0	350	4.2	3	0.7	9	0.9
Roman Catholic	1,342	29.4	2,383	25.4**	1,278	30.7	2,297	27.4**	64	15.8	86	8.7**
Other	608	13.3	1,286	13.7	555	13.3	1,198	14.3	53	13.1	88	8.9*
Total	4,564		9,378		4,160		8,389		404		989	

*.05 level.

**.01 level.

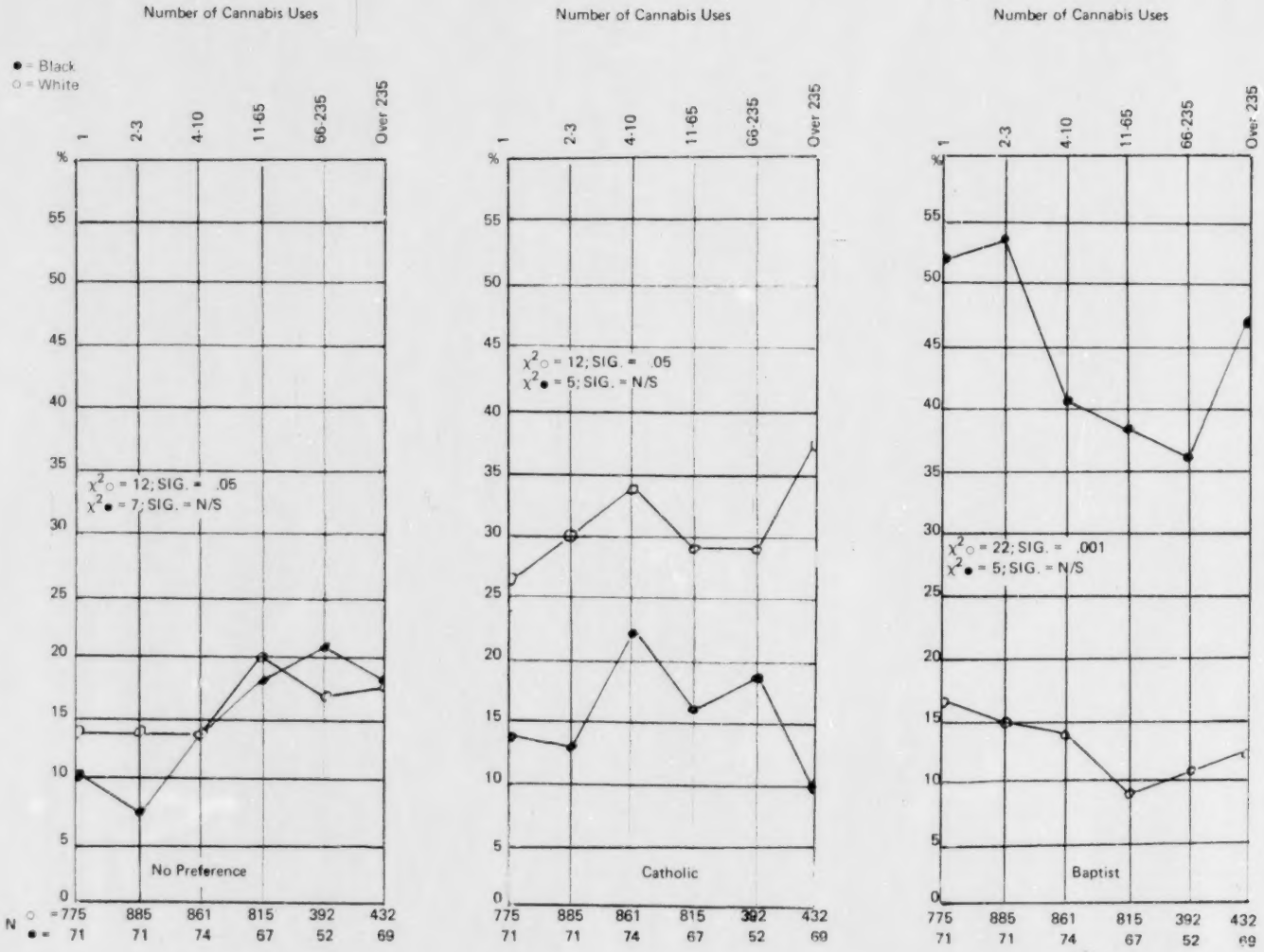

Figure 28. **Relationship Between Degree of Cannabis Use and Religious Preference.**

differences observable between the two groups are likely, therefore, to be considerably understated. These success comparisons will be made again, in considerable depth, later in the careers of these subjects.

Desirability. Desirability is a coded variable indicating whether or not the subject is still on active duty, and, if not, whether his discharge was an undesirable one. Undesirable discharges included, among several others, the following reasons:

1. Unsuitability-Character and behavior disorders.

2. Unfitness-Frequent involvement in incidents of a discreditable nature with civil or military authorities.

3. Unfitness-Multiple reasons.

4. Release prior to expiration of term of service, failure to meet minimum standards for retention in the Air Force.

In Table 5, differences in desirability between cannabis users and control subjects are displayed for the total samples and for the residual samples after all subjects discharged under reason 4, above, have been removed. Reason Number 4 is the cause for discharge used at the time to remove drug users and several other categories of undesirables from Air Force service. Even after these subjects have been eliminated, there is still a slightly larger percentage of undesirable discharges among the cannabis users than among the control subjects. Although the difference is not large from a practical standpoint, it is significant beyond the .01 level.

Table 5. **Comparison of Cannabis Users with Control Subjects, Desirability Index**

Desirability Index	Total Sample				Reduced Sample			
	Cannabis Users		Control		Cannabis Users		Control	
	N	%	N	%	N	%	N	%
Undesirable Discharge	463	10.1	141	1.5**	55	1.3	43	0.5**
Indeterminate	88	1.9	217	2.3	88	2.1	217	2.3
To Accept Commission	0	0.0	4	0.0	0	0.0	4	0.0
Currently Active	4,007	87.8	9,006	96.0**	4,007	96.4	9,006	97.1*
Other	6	0.1	10	0.1	6	0.1	10	0.1
Total	4,564		9,378		4,156		9,280	

*.05 level.

**.01 level.

Figure 29 shows the relationship between degree of cannabis experience and likelihood of getting an undesirable discharge or of still being on active duty. Figure 30 shows the same information for Blacks and Whites separately. Both figures show a very strong relationship between these two desirability characteristics and degree of cannabis use, with undesirable discharges increasing—and active duty subjects decreasing—with more and more cannabis use.

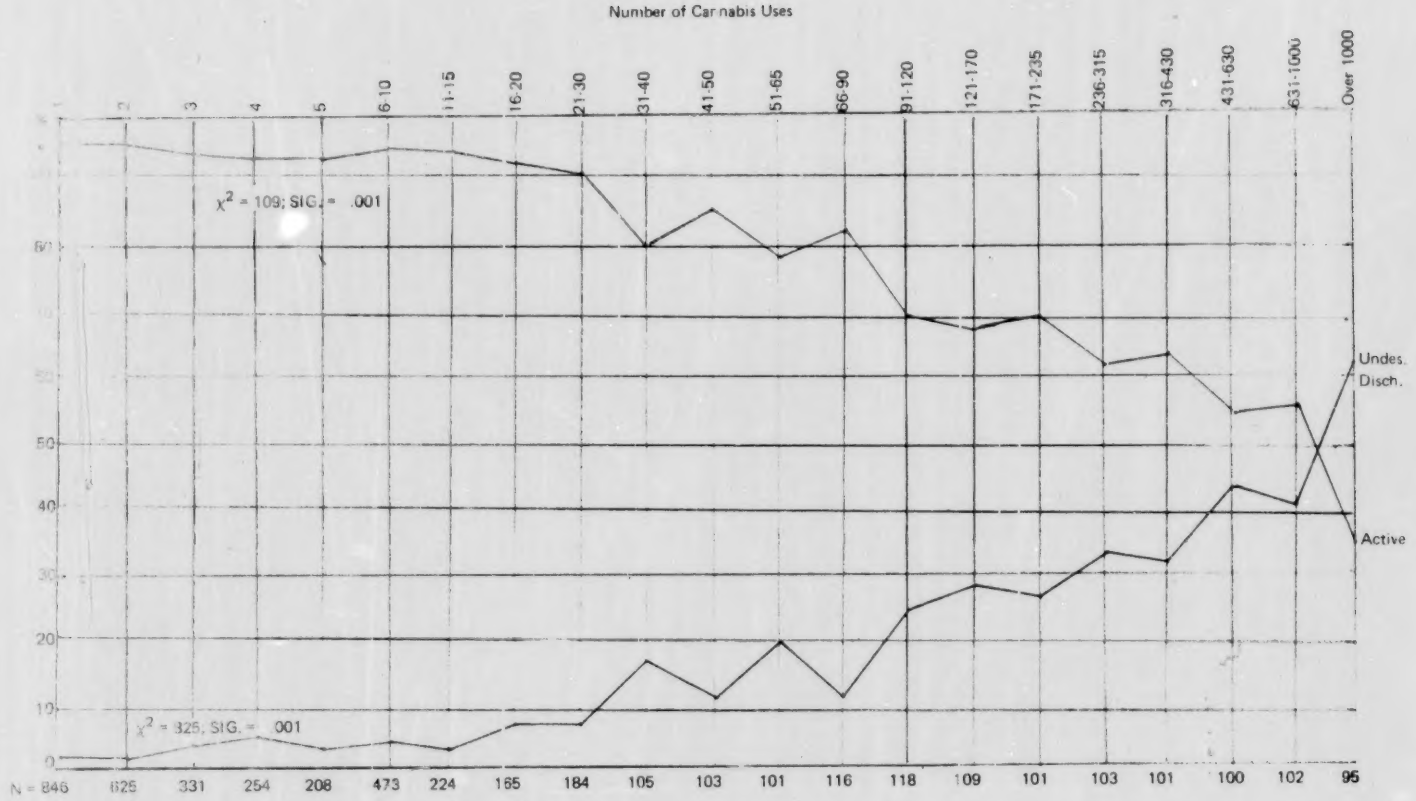

Figure 29. **Cannabis Total Vs Desirability.**

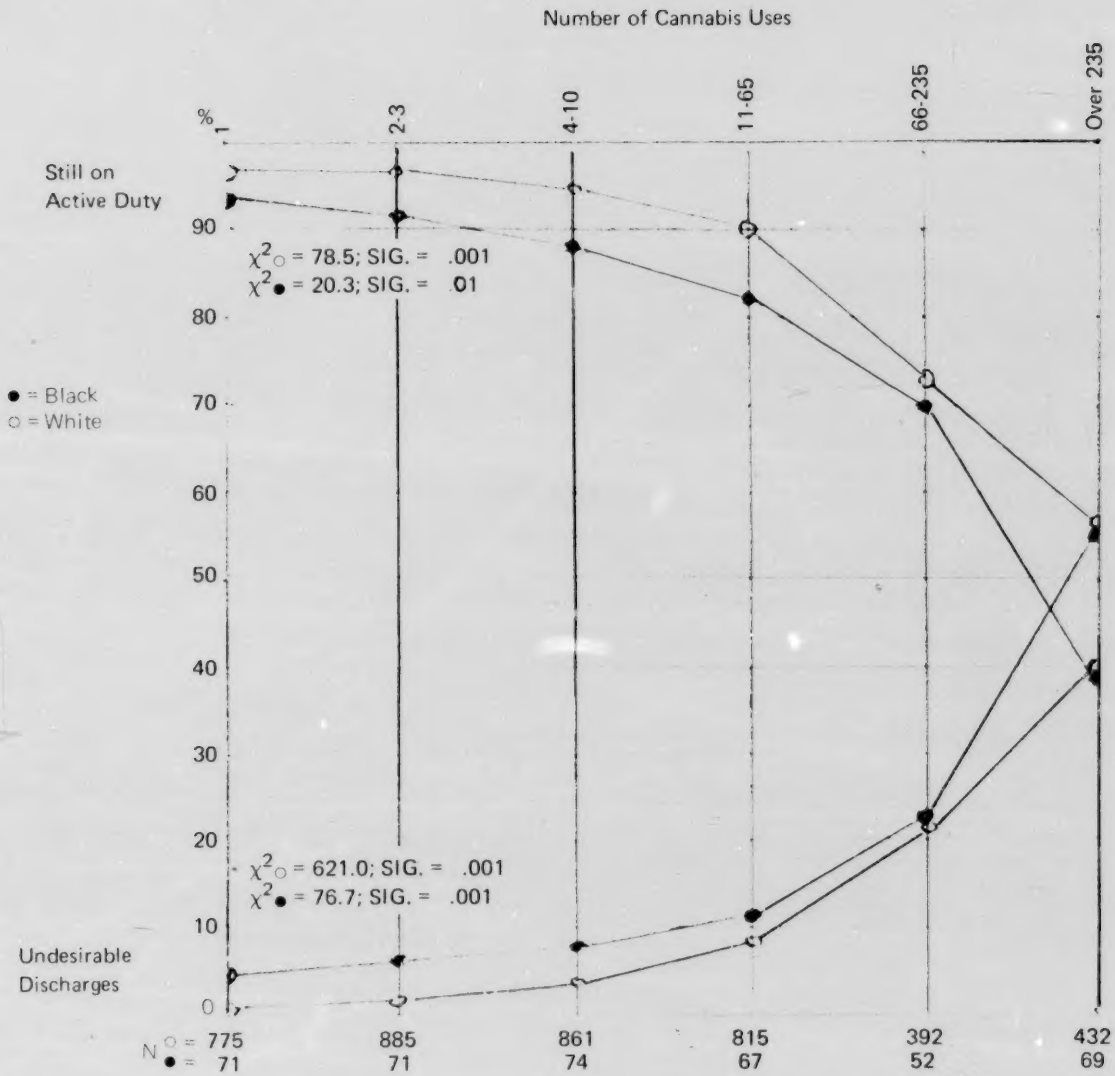

Figure 30. **Cannabis Vs Duty Status, Black and White.**

Both Figures 29 and 30 contain data on subjects discharged under reason Number 4. Figure 31 was computed on just those subjects remaining in the sample after subjects discharged under reason Number 4 were discarded. Obviously, for both Blacks and Whites, the relationship is greatly attenuated in this figure, but still easily observable.

Airman Performance Report (APR). An airman's first APR is typically made on him just about a year after he enters service. Therefore, only a small portion of the cases used in this study were available for investigating the relationship between cannabis use and APR. This relationship is shown in Table 6 and Figure 32. Table 6 shows that a smaller percentage of the cannabis users had good APRs (8 or 9) than did the control group. Because of the severe loss of cases and the consequent compression of intervals, only the relationship between intervals of cannabis use below 20 uses is shown in Figure 32, along with 20-and-over treated as one interval. Even in this compressed situation a slight but clear relationship is visible. The trend is not large, but the figure shows that, as degree of cannabis experience increases, the percentage of subjects with APRs of 8 or 9 (good APRs) decreases.

Promotion Rate. Even though these data were collected very early on these subjects, Table 7 shows that the two groups are already beginning to drift apart on promotion rate. The control group contains 23.3 percent who have been promoted to Airman First Class, while only 19.7 percent of the cannabis users have been promoted to this grade. Degree of use (Figure 33) shows only a very mild decline of percent of Airman First Class as degree of cannabis involvement increases, and a very mild rise in percent of Airman Basics. Previous work (Mullins et al., 1973) indicates that the difference between cannabis users and the control group in promotion rate will likely increase with the passage of time.

Table 6. **Comparison of APR's, Cannabis Users Vs Control Subjects**

APR	Cannabis Users		Control Subjects	
	N	%	N	%
2	1	0.3	2	0.2
3	1	0.3	4	0.4
4	1	0.3	5	0.5
5	8	2.2	15	1.4
6	19	5.2	32	3.1
7	49	13.4	103	9.9
8	135	37.0	397	38.2
9	151	41.4	481	46.3
8&9	286	78.4	878	84.5**
Total	365		1,039	

**.01 level.

Table 7. **Promotion Rate, Cannabis Users Vs Control***

Grade	Cannabis Users N	Cannabis Users %	Control N	Control %
Airman Basic	780	19.5	1,658	18.4
Airman	2,438	60.8	5,240	58.2**
A1C	788	19.7	2,102	23.3**
Sgt	0	0.0	0	0.0
S/Sgt	1	0.0	6	0.1
Total	4,007		9,006	

*Active duty subjects only.

**.01 level.

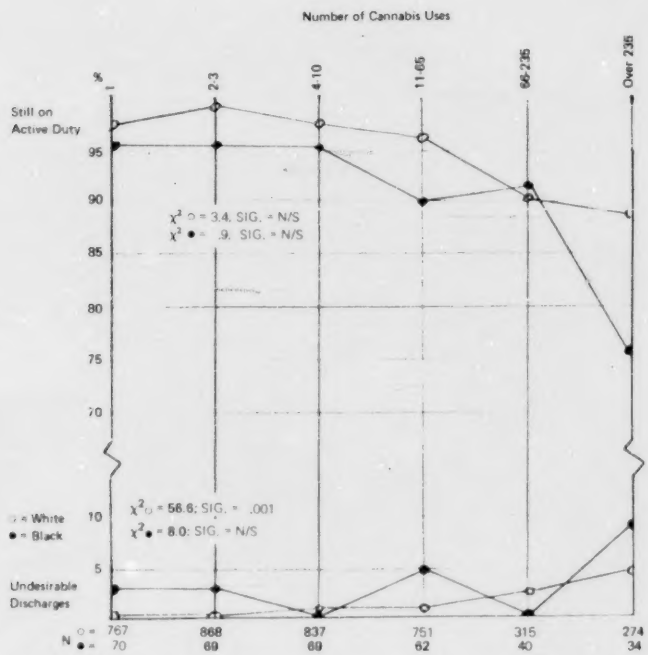

Figure 31. **Cannabis Vs Duty Status, Excluding Cases Discharged Because of Drug Abuse, Black and White.**

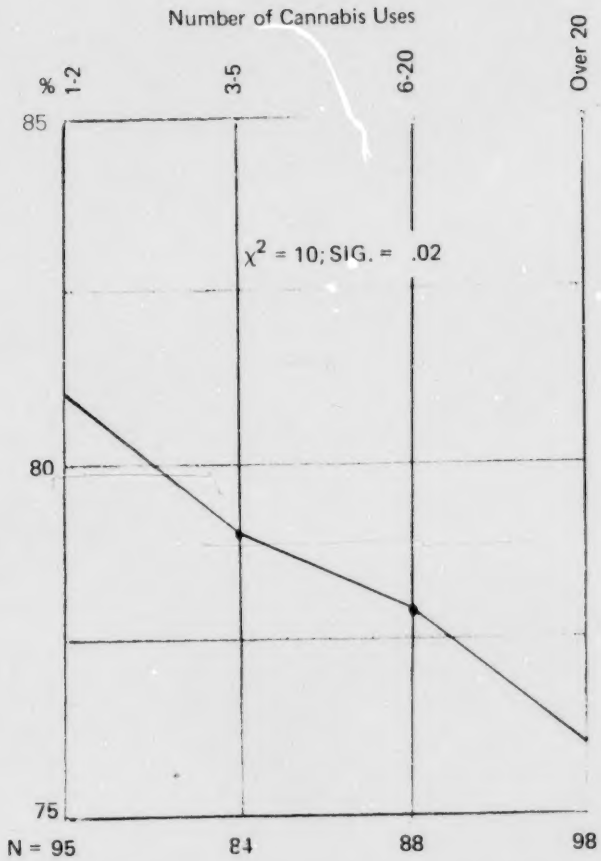

Figure 32. **Cannabis Use Vs Last APR.**

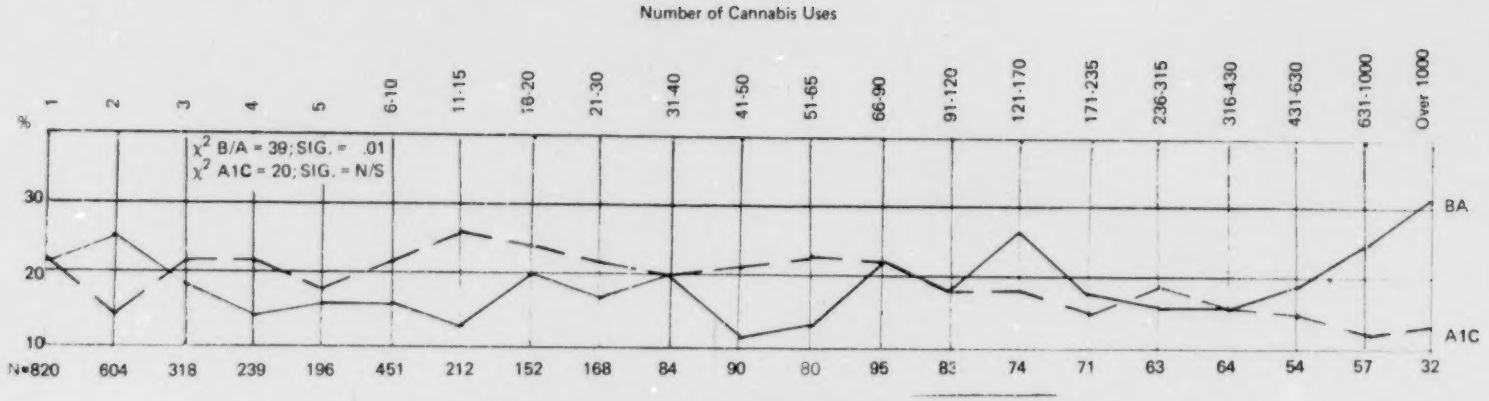

Figure 33. **Cannabis Use Vs Promotion Rate, Active Subjects Only.**

IV. CONCLUSIONS

There is a very strong tendency for progressively heavier users of cannabis to have used other drugs. The likelihood of having used other drugs increases fairly steadily from less than 10 percent for those having used cannabis once to about 95 percent for those who have used cannabis at least 1,000 times. The data do not permit conclusions concerning whether or not cannabis use "leads to" the use of other drugs, but there is no question that there is progressive involvement with other drugs as cannabis use increases. Furthermore, the same kind of progressive involvement holds when cannabis use is compared with the use of each of the specific drug categories investigated, although the likelihood of involvement is greater with some categories and less with others. However one may feel about the danger of cannabis use per se, one must acknowledge that at least there is a grave danger that its heavy use will be accompanied by the use of one or more additional drugs.

Cannabis use appears to be heavier in the North-Northeast (particularly by Blacks), and in the Far West-Pacific Coast areas (particularly by Whites). Generally, the deeper the involvement with cannabis use, the more likely it is that the subject will be of lower aptitude, and of less than 12 years of education. It appears that Baptists are found proportionately less often than expected among cannabis users, and when a Baptist cannabis user is found, he is less likely to be a heavy user. Just the opposite is true of those who indicate no religious preference.

Although the measures of service success were taken very early in the careers of these subjects, a relationship is already observable. Cannabis users tend to have lower APRs, and they are more likely to receive undesirable discharges for reasons other than drug use. Cannabis users also tend to have slower promotion rates.

This study was performed on cannabis users, whether or not they had used additional drugs. Of the 4,564 cannabis using subjects, 2,844 (62.3 percent) had used only cannabis. A later study will compare those subjects who have used only cannabis with a group formed of those who have used cannabis in combination with other drugs.

AFR 30-19, as amended in March, 1972, is quite specific relative to current enlistment and retention standards. Basic trainees are ineligible for retention who admit to pre-service drug abuse in excess of the following:

1. If he has ever used LSD or,

2. If he has ever used narcotics or dangerous drugs or,

3. If he has ever been a supplier or casual supplier of narcotics, dangerous drugs, or marijuana or,

4. If he has used marijuana more than four times or at any time in the last three months. (A more recent change, in August of 1972, relaxes these retention standards slightly.)

There are few researchers in the drug abuse area who would argue against the proposition that a one-time experimenter with marijuana is indistinguishable from one who has never used it at all. It is obvious from the data presented herein that a subject who has used marijuana more than 1,000 times is quite different in undesirable ways from the subject who has never used it. The line must obviously be drawn somewhere between one use and something higher as to whether the applicant is likely to make a desirable airman.

The enlistment and retention standards, outlined above, were an attempt to draw such a line. However, the data in this report indicate that perhaps the standards in paragraph 4 are a little too conservative. The data in this report indicate that there is little noticeable difference between those subjects who have used marijuana 20 times or less and those who have never used it at all. Certainly those subjects who have used cannabis 4 times or less have no discernible advantage over those who have used it 20 times or less. In this particular sample, 3,126 subjects have used cannabis 20 times or less and only 2,056 have used it 4 times or less. If the line is drawn at 4 cannabis uses or less, 1,070 applicants who are otherwise equally qualified would not be eligible for Air Force service. If the line is drawn at 20 cannabis uses or less, the eligible pool among cannabis users may be increased by 52 percent. How much this would increase the general applicant pool is not known, but if one assumes that about 50 percent of

all applicants have used cannabis, in patterns similar to those described in this study, and if one were to accept all applicants who have used cannabis 20 times or less, regardless of his use of other drugs, the general applicant pool should be increased by about 20 to 25 percent with no appreciable loss in quality. This could be important in a zero-draft situation.

Paragraphs 1 and 2, of the above-mentioned standards, will be addressed specifically in future work.

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